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Publications

## MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTTTER OF APPLICATIONS BY EACH OF  
(a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A  
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS  
CROWN LANDS WITHIN THE YUKON TERRITORY AND  
THE NORTHWEST TERRITORIES; and  
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY  
THAT MIGHT BE GRANTED ACROSS CROWN LANDS  
WITHIN THE NORTHWEST TERRITORIES,  
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND  
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,  
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE  
PROPOSED PIPELINES

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

September 22nd 1975

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### PROCEEDINGS AT INQUIRY

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Volume 66

CANADIAN ARCTIC  
GAS STUDY LTD.

SEP 26 1975

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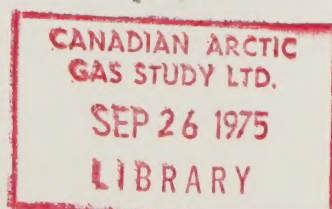




APPEARANCES:

Mr. Ian G. Scott, Q.C.	
Mr. Stephen T. Goudge,	
Mr. Alick Ryder and	
Mr. Ian Roland	for Mackenzie Valley Pipeline Inquiry;
Mr. Jack Marshall,	
Mr. Darryl Carter, and	
Mr. John Steeves	for Canadian Arctic Gas Pipeline Limited;
Mr. Reginald Gibbs, Q.C.	
Mr. Alan Hollingworth	for Foothills Pipelines Ltd.;
Mr. Russell Anthony,	
Prof, Alastair Lucas	for Canadian Arctic Resources Committee;
Mr. Glen W. Bell and	
Mr. Gerry Sutton	for Northwest Territories Indian Brotherhood and Metis Association of the Northwest Territories;
Mr. John Bayly	for Inuit Tapirisat of Canada and the committee for Original Peoples Entitlement;
Mr. Ron Veale and	
Mr. Allen Lueck	for the council for the Yukon Indians
Mr. Carson H. Templeton	for Environment Protection Board;
Mr. David Reesor	for Northwest Territories Association of Municipalities
Mr. Murray Sigler	for Northwest Territories Chamber of Commerce

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Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Genest

Yellowknife, N.W.T.

September 22nd, 1975.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT:

E.A. MIROSH, Resumed:

A.F. BAUER, Resumed:

W. KOSTEN, Resumed:

P. JARVIS, Resumed:

THE COMMISSIONER: Well I will  
call the hearing to order, since -- I think Mr. Genest  
is cross-examining the panel, if I am right.

MR. GENEST: Thank you, sir.

CROSS-EXAMINATION BY MR. GENEST:

Q Mr. Kosten, sir, when  
did you receive your assignment to do consulting work  
for the Foothills group?

WITNESS KOSTEN:

A December of 1974.

Q And were you primarily  
responsible for advising Foothills on the problems of  
scheduling the work?

A Essentially developing the  
costs.

Q Well what about --

A I should say --

Q -- what about the schedule?

A And the schedule, yes.

Q And the schedule.

A This was a joint discuss-  
ion, we did not do this independently. It was in con-  
sultation with Foothills.





Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Genest

Q I understand, but were you  
the primary advisor -- or perhaps I had better direct  
that to Mr. Mirosh. Did you primarily rely on Mr.  
Kosten's input, Mr. Mirosh?

WITNESS MIROSH:

A Yes that's true, as to  
the right-of-way and other advice related to construct-  
ion.

Q What about spreads and the  
use and the productivity to be expected of spreads?  
Was that Mr. Kosten's primary responsibility?

A Yes primarily, but again  
working with FOothills' staff.

Q Did you rely on Mr.  
Kosten's advice in that connection?

A We certainly took it into  
account, yes.

Q Well did you diverge from  
it in any respect?

A No, but we continued dis-  
cussions with him and I guess it evolved out of mutual  
discussion.

Q Did Mr. Kosten participate  
in the preparation of part 3 of your application, the  
facilities volume?

A Yes, some of his material  
is in there. The text was largely written by FOothills'  
staff.

Q You were shaking your head  
at that, Mr. Kosten.





WITNESS KOSTEN:

A Not in the direct preparation of the text, no.

Q Did you read it before it went out?

A I don't recall that I did, no.

Q Who prepared the charts at -- and I think perhaps I better give everybody a pause. I am going to be dealing with part 3 of the Foothills' application at some length, Mr. Commissioner.

THE COMMISSIONER: All right.

MR. GENEST: Sections D, E, F and G.

Q While everyone is getting on with that, could I ask you, Mr. Kosten, whether in coming to your conclusions and judgments as to the planning of the construction of this pipeline, you consulted with contractors?

A Yes I did.

Q Did you consult them in particular with respect to scheduling and the productivity of spreads?

A Yes I did.

Q Could you tell me which contractors you consulted?

A Marine Pipeline of Canada.

THE COMMISSIONER: What's the name?

A Marine Pipeline of Canada



1 Limited.

2 THE COMMISSIONER: Marine?

3 A That is correct.

4 MR. GENEST:

5 Q Anybody else?

6 A No sir.

7 Q Did they assist you in  
8 making cost estimates, Mr. Kosten?

9 A We worked on the cost  
10 estimates together.

11 Q Together. Now, Mr.  
12 Kosten, could I draw your attention to Part 3,  
13 Facilities, it's the black volume with the red maple  
14 leaf in the corner, and immediately following Tab D-1,  
15 there are a number of charts, starting at page 3D17,  
16 there's a bar chart --

17 A Yes.

18 Q -- and at 3D18, there are  
19 some illustrations of the total manpower requirements  
20 for each spread, and 3D19<sup>there</sup> is a manpower requirement for  
21 a typical spread. Do you have those in front of you,  
22 sir?

23 A Yes, I do.

24 Q Now, am I correct in  
25 interpreting these as showing that main construction  
26 does not start until the 1st of January?

27 A That is correct.

28 Q And is that the plan?

29 A Yes.

THE COMMISSIONER: Excuse me.





1 You are talking about pipe laying?

2 A That is correct. The  
3 direct pipe laying activities.

4 THE COMMISSIONER: Yes.

5 MR. GENEST:

6 Q And is it on that assumption,  
7 sir, that your productivity estimates are based?

8 A Well the productivity is  
9 based on what we judged that the spread could do essentially  
10 during a day's work. The period of construction  
11 that we anticipate would be the major activities, would  
12 be starting January or possibly, in some cases, February.

13 Q Let's see if we understand  
14 each other. By productivity, I mean how many miles of  
15 pipe one spread can lay in one season, is that the right  
16 expression?

17 A That would be correct,  
18 yes.

19 Q Right. Sir, would you  
20 turn to the bar chart, that's at page -- well before we  
21 do that, let's go back to 3D18, that's the total manpower  
22 requirements for five spreads. That again shows  
23 that you are starting main construction on the 1st of  
24 January in both seasons?

25 A That is essentially  
26 correct, yes.

27 Q Sir, did I say something  
28 different than eight spreads? I said five spreads, that  
29 should read eight spreads.

30 THE COMMISSIONER: Well where





Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Genest

1 are we now, what --

2 MR. GENEST: I'm at 3D18, sir.

3 THE COMMISSIONER: Right, okay.

4 MR. GENEST: It says total  
5 manpower requirements for eight spreads.

6 Q And you have, if you look  
7 at the 1978 season, which is the first season in which  
8 pipe is laid, am I correct?

9 A Yes.

10 Q Immediately prior to the  
11 1st of January, you have a little jump in manpower  
12 requirements, rather a small one, that is called for  
13 by grading and survey route verification?

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1 A Yes.

2 Q That's the only pre-  
3 construction activity then, do I take it, that is  
4 taking place up to the 1st of January,

5 A There will be no  
6 pipeline activity during that period, sir.

7 Q Now by no pipeline  
8 activity, could I understand what you mean?

9 A Pipe laying, welding --

10 Q Trenching?

11 A Yes.

12 THE COMMISSIONER:  
But the pipe would be  
13 transported to sites along the pipeline, would it,  
14 along the route, before January 1?

15 A Yes sir, during the  
16 summer, That is to stockpile .

17 Q You mean by barge?

18 A That is correct.

19 Q But when would trucks  
20 or other vehicles bring the pipe from the stockpile  
21 sites to the --

22 A This would be an  
23 inherent operation concurrent with all other pipeline  
24 laying activities.

25 Q So it wouldn't begin  
26 until after January 1?

27 A I can visualize where  
28 there might be some instances where it might begin if  
29 conditions are suitable prior to the 1st of January, yes.  
It depends on the weather condition at the particular time  
sir.





MR. GENEST:

1 Q The plan sir, as I  
2 understand it doesn't call for that?

3 A That is correct.

4 Q The plan calls for your  
5 pipe to be deposited at your base camp?

6 A Yes sir.

7 Q Then would you turn to  
8 the first chart, 3D17, which is the bar chart, headed  
9 construction schedules.

10 A Yes sir.

11 Q I've got a couple of  
12 general questions about this, one. When I looked at  
13 this, I was puzzled by the difference between solid  
14 lines and dashed lines that appeared, if you look right  
15 at the very first line. There's a solid -- which is  
16 under geotechnical surveys I believe. You need a ruler  
17 to read these, Mr. Commissioner.

18 We have some dashed lines,  
19 right up to May of 1976 then a solid line. What's  
20 the difference between the -- what's the dashed line  
21 supposed to mean?

22 A I would defer that  
23 question to Mr. Mirosh.

24 Q Mr. Mirosh, can you  
25 help me.

WITNESS MIROSH.

26 A That signifies a  
27 preparatory activity.

28 Q A preparatory activity.  
29 Now, let's apply that to geotechnical survey, you have a  
30



1 preparatory one till the end of May, 76?

2 A Yes, in fact, we have been  
3 carrying out some geotechnical work this year, and that's  
4 what I would classify as preparatory.

5 Q Do the dashes -- let's  
6 look at January, 1975, we see what, to me, appears to be  
7 half a dash. Does that mean that you only did half of  
8 January?

9 A I suspect a draftsman  
10 may have made a half dash there without cause.

11 Q But in any event, do I  
12 take it that the dashes, where it's broken, it means '  
13 prepare -- that's the distinction, it means preparatory  
14 activity, does it?

15 A That was our intent,  
16 that's right.

17 Q Well let's go down a  
18 few lines to the places where the dashes come later.  
19 If you look at the line construction survey, you have  
20 a solid line from June to October, 1976, do you follow  
21 me?

22 A Yes.

23 Q Am I on the right line  
24 here? Then you have a--  
25 THE COMMISSIONER:  
26 Sorry, what is that  
27 one again.

28 Q Under survey, Mr.  
29 Commissioner, we have a line called civil construction  
30 survey. No, I got the wrong one, I'm sorry.  
Mainline construction survey. That's the next one. Have





1 you found that sir?

2 A Yes.

3 Q It's the fifth item  
4 under survey. You see a solid line, commencing in '78,  
5 in January of '78 and lasting until the end of April of  
6 '78 and a dashed line until October of '78, and a solid  
7 line in 1979 until April and then a dashed line again.  
8 Does that mean preparatory work?

9 A I think in that particular  
10 example that you have cited, that's a winding down of  
11 activity.

12 Q So the dashes, then we  
13 have it in one case mean preparatory, another means  
14 winding down.

15 A Yes, I think when the  
16 dashes are in front of us at all, that it would be  
17 preparatory and after the solid it would be winding  
18 down.

19 Q You have no winding down  
20 for instance for borrow areas?

21 Under civil construction?

22 A Yes, it's not shown  
23 there.

24 Q Should it be?

25 A I don't think so.

26 Q Let's go to the one  
27 right above that right-of-way clearing, mainline.  
28 I think we've had it in testimony that you plan, as I  
29 understand it anyway, you plan to clear a whole line in  
30 one swoop in advance of anything else?





1 Is that right?

2 A Except for those areas  
3 that are classified as sensitive permafrost terrain.

4 Q Well let's talk in  
5 general terms. Is it your intention to clear the whole  
6 right of way?

7 A Yes, with certain  
8 exceptions.

9 Q And again, what do the  
10 dashed lines mean there, you'll see that it seems  
11 to be dashed until December of '76 and then it's solid  
12 until April of '77 and it's dashed again.



1 A Could you give me that  
2 reference again? We seem to be lost.

3 Q Under civil construction,  
4 right-of-way clearing, main line? It's the sixth item  
5 down, under the heading "Civil Construction".

6 A Yes.

7 Q Well what I am trying to  
8 get at is there any significance in these dash lines?  
9 They puzzled me, and I spent some hours over them over  
10 the weekend, and I'm trying to get back at you. What  
11 do they mean? What does it mean in the case of right-of-  
12 way clearing, for instance? What's the difference  
13 between a solid line and a dashed line?

14 A Well I would suspect --

15 Q Was it just that you just  
16 ran out of ink?

17 A No, it's the assembly of  
18 equipment and moving in.

19 Q Well how does that apply  
20 in June of '77? And November-December of '76, in fact  
21 the whole of '76 is dashed.

22 WITNESS KOSTEN:

23 A This essentially, I believe,  
24 if I may respond to that, would be preparatory work for  
25 mobilization of your forces. Your main clearing would  
26 be done during the months of January, February, March  
27 and April, and you would have demobilization.

28 Q I see. Now while I'm on  
29 this right-of-way clearing, I think you said that your  
30 plan was to clear the whole right-of-way in advance of





1 construction except in sensitive permafrost terrain?

2 Did I understand you correctly, Mr. Mirosh?

3 WITNESS MIROSH:

4 A Yes, that's essentially  
5 correct.

6 Q And how many miles of  
7 that kind of terrain are you anticipating or planning  
8 for?

9 A We have been working on  
10 this but we haven't got a fix on that number yet.

11 Q Have you any idea?

12 A I think it would take some  
13 geotechnical field work to classify this terrain.

14 Q So your bar chart then  
15 would not disclose when you plan to do that work?

16 A Yes, the geotechnical  
17 work is shown.

18 Q No, I don't mean the geo-  
19 technical, I mean the clearing of the right-of-way in  
20 sensitive permafrost areas?

21 A That would be done imme-  
22 diately preceding the pipeline construction activities  
23 of that year. It would be part of the main line spread  
24 activities in the sensitive areas.

25 Q Where would it be for your  
26 second year of pipeline construction, on the bar chart?

27 A It should be starting in  
28 about January, I would suspect.

29 Q Well, can you show it to  
30 me on the bar chart?





1 Your second season, if I can  
2 help you, of your construction -- the '79 season is your  
3 second season of pipeline construction, and I don't see  
4 anything there that shows any right-of-way clearing in  
5 preparation for that season?

6 A Yes, it's not shown there.

7 Q So it's not shown on the  
8 bar chart?

9 A Correct.

10 Q Because you don't know  
11 yet, because you want some more surveys?

12 A Correct.

13 Q Can I take you down this  
14 chart now to the heading "Pipeline Construction, Main  
15 Line". Do you see that?

16 A Yes, sir.

17 Q Now I have to have my  
18 handy ruler or I can't follow. I'm sorry to come back  
19 again to this dashed line bit, but I see some dashed  
20 lines and then some solid lines for mobilization. Is  
21 -- are there degrees of mobilization? That you intend  
22 to convey by this?

23 A Well there are degrees,  
24 I guess. There's mobilization from staging areas to  
25 wharf sites; mobilization from wharf sites to working  
26 areas.

27 Q Well Mr. Mirosh, I would  
28 like you not to guess. If you're just guessing, I  
29 suppose we can all guess, but is that what the bar  
30 chart is intended to show?



1 A Certainly.

2 Q So it's intended to show  
3 varying degrees of mobilization?

4 A Well it shows the mobili-  
5 zation as we saw it at that time, that's right.

6 Q And you have a solid  
7 period of mobilization at the end of '77, and a broken  
8 period of the same before that? Is that we are going  
9 to expect? Infact, there is a solid period if you look  
10 at the chart between December -- the beginning of  
11 December of '76, and the end of December of '77, and  
12 then it starts to dash itself again.

13 A No, I suspect that should  
14 have been a shorter dash than a longer one that's shown  
15 there.

16 Q How's that, sir? Can you  
17 explain that to me? Why should it have been a shorter  
18 dash?

19 THE COMMISSIONER: You mean it  
20 should have been dashed until --

21 A It should have been dashed  
22 as the other dashes are dashed.

23 THE COMMISSIONER: You mean  
24 that dashed line should continue 'til October 1st, '77?  
25 That's what you are saying, I take it?

26 A Yes, I think that's the  
27 right interpretation of it. That is the right inter-  
28 pretation.

29 MR. GENEST:

30 Q So that's just a





1 draughtsman's error? I now move to pipe stringing and  
2 ditching on the same chart?

3 WITNESS KOSTEN:

4 A Yes, sir.

5 Q Pipe stringing, as I  
6 understand it, is the operation of laying the pipe  
7 alongside the right-of-way ready to drop in, is that  
8 right?

9 A It's the stringing of the  
10 pipe ahead of the welding, yes.

11 Q Well I'm very ignorant  
12 in these matters, Mr. Kosten. You will have to help me.  
13 Did I have it approximately right? You layout the pipe-  
14 line beside the right-of-way?

15 A Beside the ditch line,  
16 yes.

17 Q Beside the ditch line.

18 A On the right-of-way.

19 Q All right, and the ditch-  
20 ing is the digging of the hole in which you are going to  
21 put it in?

22 A That is correct.

23 Q All right. Now, if we  
24 look at pipe stringing on this bar chart, we have it  
25 starting on the 1st of January --

26 A That's correct.

27 Q -- '78, is that right?  
28 And then there's this nasty dash there. Do I take it  
29 that's -- maybe my chart is wrong?

30 A That would be a



1 continuous operation.

2 Q It's a continuous line?

3 A Right.

4 Q I'm sorry, I'm confused  
5 again, Mr. Kosten, can you help me? This to me shows  
6 that you are going to be pipe stringing in December?

7 A That's a possibility, yes.

8 Q Well it's a possibility;  
9 your bar chart shows that you plan to do it, doesn't it?

10 A That's correct.

11 Q Well now, what is right?  
12 Is it the chart -- isn't pipe stringing part of your  
13 main line construction activities?

14 A Yes, sir.

15 Q Well now you just told me  
16 that you didn't plan to start until the 1st of January,  
17 and your bar chart shows that you plan to start that in  
18 the 1st of December.

19 A Your mobilization would  
20 take place in the month of December for that operation,  
21 as it would for most of the others.

22 THE COMMISSIONER: You would be  
23 starting the engines down at the wharf?

24 A Yes, sir.

25 MR. GENEST:

26 Q Would that apply to ditch-  
27 ing too, because that shows it starting on the 1st of  
28 December?

29 A Yes, sir.

30 Q And it's a solid line.





1 A Yes, sir.

2 Q And that's just mobilizat-  
3 ion for ditching? How do you mobilize for ditching for  
4 one whole month?

5 A You have to get your crews  
6 in, sir.

7 Q Well can't you get them  
8 in earlier?

9 A There would be no point  
10 in getting them in earlier.

11 Q So you're not really  
12 ditching there, you're just getting your crews -- that  
13 first part of the solid bar for ditching is not ditching,  
14 it's getting ready for ditching?

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1 A We anticipate that  
2 there could be some ditching carried out during that  
3 month sir.

4 Q Why -- what's the reason  
5 you can't ditch all of December?

6 A I'm sorry, I don't --

7 Q Why can't you start your  
8 ditching the 1st of December as you've shown on this  
9 chart?

10 Why can't you actually dig  
11 a trench, starting the 1st of December.

12 A This is dependent on  
13 weather conditions, and other factors such as that.  
14 I couldn't give you a precise date on which the  
15 operation could start. We have built into our estimates,  
16 a certain number of overall days required.

17 Q Well if one reads  
18 your bar chart then, would you agree with me that  
19 to the reader, one would conclude that that starts on  
20 the first, the ditching is going to start, the stringing  
21 is going to start on the 1st of December?

22 A That is correct sir, that's  
23 the way it can be interpreted.

24 Q And if one reads your  
25 chart 3D1.2 one would conclude that that wouldn't start  
26 until the 1st of January?

27 A That's the way it reads  
28 sir.

29 Q All right now on which  
30 of these assumptions have you come to your conclusions





1 about how many miles of pipe you can lay in one season?

2 A We have based it on the  
3 number of days per' season that it will take to complete  
4 that operation whenever it starts.

5 Q I know that sir, but when  
6 does the season start, is it the 1st of January or the  
7 1st of December.

8 A It's shown here that it  
9 could start on the 1st of December.

10 Q All right. Then if it  
11 could be started on the 1st of December that would  
12 assume that you have done the necessary preparation  
13 prior to that, is that right? The clearing and the --

14 A That's correct sir.  
15 The clearing and right of way preparation actually is  
16 intended to be completed the previous season.

17 The intent there is that  
18 there might be some rework required or -- during the  
19 period when there is no activity or following the period  
20 when there is no activity and there might be some  
21 reparation if you want, required ahead of the main  
22 operations.

23 Q Mr. Kosten, you have had  
24 considerable experience with Mannix, I take it. in  
25 winter construction?

26 A That is correct, yes.

27 Q You have done so, a  
28 considerable amount of it in northern Alberta?

29 A Yes sir.

30 Q And was it customary there



1 to start on the 1st of January?

2 A This would depend on the  
3 ambient temperature really as much as anything sir. If  
4 -- in Northern Alberta and in Northern B.C., there are  
5 occasions and this varies from winter to winter, when it  
6 is just too cold to work, during that part of the year.

7 Q Too cold to work in  
8 January?

9 A There have been instances  
10 of it yes.

11 Q That's generally true  
12 in the North too isn't it? January is generally the  
13 coldest month?

14 A I would expect so, yes  
15 sir.

16 Q And if you could get a  
17 start, for instance, in November and get some work done  
18 in November and December, if the ground were in suitable  
19 condition, you would opt that rather than --

20 A You would get your work  
21 done as soon as you can, yes sir.

22 Q On your chart 3D1.2,  
23 page 3D1.8, that's the one that shows total manpower  
24 requirements for the eight spreads. You have a note  
25 there that says -- have you got that, Mr. Kosten?  
26 There's a note at the top right hand corner, and the  
27 first note is two weeks break at Christmas.

28 A Yes sir.

29 Q What's the meaning of that  
30 sir?





1 A The meaning of it is  
2 that during the period between Christmas and New Years,  
3 essentially or just before Christmas, our experience  
4 has been that it is difficult to keep people on the  
5 job, that they want to go home for the holidays,

6 Q For two weeks.

7 A Normally what you would  
8 do is shut your crews down for approximately ten days.

9 Q That's what you normally  
10 did in Northern Alberta.

11 A Yes sir.

12 Q Does it necessarily  
13 follow sir from that you couldn't keep operating over  
14 the Christmas break with just a few days off if you  
15 made the financial incentive good enough?

16 A If you made the financial  
17 incentive good enough I suppose you could, yes.  
18 What happens is, various people on the crews, not  
19 necessarily all of them take off and you can't -- it  
20 becomes a question of whether you can operate with a  
21 reduced manpower.

22 Q They take off regardless  
23 of what you offer them?

24 A That's correct.

25 Q That two week break at  
26 Christmas assumes that all your 700 men would be  
27 off at that time. You would be shutting down in fact?

28 A Yes. I should -- I'd  
29 like to correct that statement sir. I wouldn't anticipate  
30 having 700 men on the project at that point.



THE COMMISSIONER:

But you would early in  
January, wouldn't you?

A Yes sir.

MR. GENEST:

Q If you went back to your  
bar chart and you were able to start ditching on the  
1st of December and laying pipe at that time, wouldn't  
you have your top manpower requirements sometime in  
mid December?

A The intent of the chart  
I believe is more to show the duration of time that the  
spread is working.

Q Let's forget the chart  
for a minute and let's say you start on the 1st of  
December.

A Yes sir. I wouldn't  
anticipate starting on the 1st of December.

Q Let's assume that you do.  
Let's assume that for a moment.

A All right, fine.

Q When would your peak  
manpower be present on your spread?

A It would take you about  
15 days.

Q So you would expect to  
have them there about mid December?

A If you anticipated starting  
on the 1st of December, yes.

Q If you go back to the  
next page, 3D39 Mr. Kosten, you've got a chart there,  
Chart 3D1.3 which is headed manpower requirements for



1 typical spread pipeline construction only, with the  
2 figure of 490 as your peak --

3 A Yes sir.

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Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Genest

Q How do I reconcile that with  
the two on the previous page?

1 You have got manpower peak of  
2 700. In your note it says you have got a two week break  
3 at Christmas.

4 A I can't reconcile that,  
5 sir, I didn't make the chart up.

6 Q Mr. Mirosh, can you help  
7 me?

8 WITNESS MIROSH:

9 A Yes, there's a great deal  
10 of support work which is going on at the same time as  
11 the right-of-way work, and the difference in numbers  
12 reflects the support or off-right-of-way work.

13 Q You have about 210 people  
14 off the right-of-way, if we are taking 700 and 490.  
15 is my arithmetic right?

16 A Yes, I think 210 is the  
17 number that would result from the difference in those  
18 two.

19 Q Where would those 210 be?

20 A They would be at wharf  
21 sites; they would be at borrow sites; they would be  
22 making concrete weights; they would be in the general  
23 vicinity supporting the actual right-of-way work.

24 Q Are they in separate  
25 camps, Mr. Mirosh, or -- how do you plan then? Where  
26 would you keep these extra 210 men?

27 A They would be both at the  
28 camps on the right-of-way and at other camps that may  
29 be required at such areas as wharf sites and stockpile  
30 sites.



1                                   Q     I'm trying to find a dia-  
2     gram somewhere. I just want a little light from you,  
3     Mr. Mirosh, you can see I am in need of it. I think  
4     there is a chart in here somewhere that shows that your  
5     camps, 3D29, page 3D234. If you look under Tab D-2,  
6     and you get almost to tab D-3, somewhere around there  
7     you will find 3D234 which is a typical main line con-  
8     struction camp configuration.

9                                   A     Okay.

10                               Q     And you have a 500 man  
11     camp. Now, do I take it from your last answer as to  
12     these men who wouldn't be in the main construction crews,  
13     some 200 of them, that your camps might be larger than  
14     500 man camps?

15                               A     No, there are some locat-  
16     ions where there might be camps other than the work pads.  
17     One that comes to mind is Swimming Point, but in  
18     general, if you accept the fact that we have 17 work  
19     sites where compressor stations would be located and  
20     placed, let's say an average of 400 men at each location,  
21     then you end up with sufficient beds, I believe, for the  
22     forces we are talking about.

23                               In other words, some spreads  
24     could be working out of two camps which would be 50  
25     miles apart. It's not likely they would be but that  
26     there would be sufficient accommodation.

27                               Q     Thank you, sir. Mr.  
28     Bauer, I think I should address this to you, or perhaps  
29     Mr. Kosten. I'll try both of you. At page 12 of your  
30     prepared evidence, I'm at page 11, you are dealing





1 there with your proposal to clear the route one year in  
2 advance of actual construction, and I understand from  
3 what Mr. Mirosh just said, that that means the route,  
4 the whole route except for areas of sensitive permafrost  
5 which you haven't determined yet. Am I with you so  
6 far?

7 A Yes.

8 Q Now apart from those  
9 areas that you don't know about yet, do I understand  
10 this correctly to mean that you are going to clear the  
11 whole right-of-way in one season?

12 WITNESS BAUER:

13 A That is correct.

14 Q Even for places where  
15 construction is not scheduled to be done for two seasons  
16 yet?

17 A That's correct.

18 Q And does this include  
19 grading?

20 A Only where absolutely  
21 necessary.

22 Q Well, do you know where  
23 it's absolutely necessary?

24 A That we can only determine  
25 once we are in the field.

26 Q And what are you going  
27 to do in the meantime in the summer in which you are  
28 not going -- you are going to have grading in one  
29 winter; you are going to have a summer go by with the  
30 right-of-way -- at least, I'm sorry, I'm exaggerating.



1 You are going to have the right-of-way cleared in one  
2 winter; you are going to have a summer where it sits  
3 there cleared; and a winter where you are going to  
4 sink pipe over certain parts of it, and then you are  
5 going to have another whole summer where that right-of-  
6 way still lies cleared, and you say the only exception  
7 to that is areas of sensitive permafrost. Does that  
8 mean discontinuous permafrost, or continuous permafrost,  
9 in what zone are we talking about?

10 WITNESS MIROSH:

11 A Well, for us that means  
12 soils which would be classified as fine-grained, ice  
13 rich, and --

14 Q So that could lie anywhere,  
15 I suppose? That could be anywhere along the route, you  
16 could have areas in the discontinuous permafrost zone  
17 where there are that kinds of soil that you wouldn't  
18 want to touch?

19 A Yes.

20 Q And don't these occur at  
21 scattered intervals along the whole pipeline right-of-  
22 way down, at least to Fort Simpson?

23 A Yes, they occur in patches.

24 Q And you won't be able to  
25 tell where they are, will you, until you have done some  
26 considerable work?

27 A Yes, we will have to do  
28 some geotechnical work to tell where they are, that's  
29 right.

30 Q Well fairly detailed



1 geotechnical work?

2 WITNESS BAUER:

3 A That's correct.

4 Q Is that correct?

5 What I'm wondering about is  
6 how efficient is it for you to plan to clear the whole  
7 right-of-way when you will have to sort of start and  
8 stop and leave places that are permafrost, is that what  
9 you really plan to do, and if so, how are you going to  
10 do it? What's the practical way of doing that?

11 A Well the intent is to  
12 clear to number one, to create a continuous access for  
13 logistic movements between camps.

14 Q Right. That's from your  
15 wharf sites?

16 A Well from the wharf sites  
17 you move to the right-of-way or other camp sites, and  
18 the camps approximately 50 miles apart, we want to pro-  
19 vide some interconnecting access by means of utilizing  
20 the right-of-way wherever practical.

21 Q Well now, how are you  
22 going to do that, Mr. Bauer?

23 A By having the right-of-way  
24 cleared.

25 Q And that's going to give  
26 you access?

27 A That gives us access, yes.

28 Q And -- but what kind of  
29 vehicle or what kind of means?

30 A Well in wintertime you





1 travel with normal vehicles.

2 O I think -- I'm not follow-  
3 ing, I'm sorry.

4 WITNESS KOSTEN:

5 A To clarify that, if you  
6 had to skip a section of it, then you would have to find  
7 access around the area, by what are commonly called  
8 Shoo-fly roads. It's not necessary for that operation  
9 to clear the entire right-of-way. You would either  
10 clear an area along your right-of-way of sufficient  
11 width to be able to get by it, or bypass it.

12 Q And when would you be in  
13 a position to determine which areas you'll bypass --

14 A When you have sufficient  
15 --

16 Q -- and which you won't?

17 A When you have sufficient  
18 geotechnical information to identify these areas.

19 Q What's the quality of the  
20 information you'll need to be able to determine that?

21 WITNESS MIROSH:

22 A Well I think we have some  
23 idea of what will give us a rough indication right now,  
24 but we're not convinced that it's adequate, and that is  
25 the terrain typing. Beyond that, one would have to then  
26 presumably after a field investigation, after a visual  
27 inspection, then determine where drilling would occur  
28 to get an idea of the subsurface conditions.

29 Q Mr. Williams said that I  
30 should leave this alone, but I am not willing to.



1 I have trouble understanding  
2 how that is a superior way of going about it, then to  
3 clear immediately before the season you are going to  
4 construct?

5 A Well I think you will re-  
6 call in somebody's direct testimony here, we were trying  
7 to level or reduce manpower peaks, and this is certainly  
8 one way of lengthening out the job, as it were.

9 Q And is that the chief  
10 reason?

11 A I believe there were one  
12 or two other reasons.

13 WITNESS BAUER:

14 A Yes, one is --

15 Q Could you refresh my  
16 memory?

17 A If I may look through my  
18 notes. One of the reasons is to minimize congestion  
19 on the right-of-way, and provide early access in the  
20 area where permanent roads do not exist.

21 Q That's at page 11, is it,  
22 Mr. Bauer?

23 A It's question 12.

24 Q Question 12. Don't you  
25 get the same thing if you could do it all in one year  
26 ahead of time, ahead of the time of construction?

27 A Well you run the risk of  
28 creating a bottleneck which then you don't have any  
29 chance but to extend the whole construction period.

30 Q I'm sorry, I didn't --





1 you stand the risk of creating what?

2 A Creating a bottleneck.

3 It means if you for instance create a congestion and  
4 you already have a very tight construction schedule to  
5 meet, then you endanger that schedule. That means you  
6 have to postpone or maybe extend another year for con-  
7 struction, or add another year.

8 Q What kind of bottleneck  
9 do you envisage?

10 A Well the bottleneck could  
11 be, for instance, if say you have a wildcat strike, as  
12 an example, of your clearing crews.

13 THE COMMISSIONER: On the  
14 clearing?

15 A On the clearing.

16 THE COMMISSIONER: Yes.

17 A And you have no means of  
18 recouping that time.

19 THE COMMISSIONER: Carry on,  
20 I'm listening.

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1 A Then you're more or less  
2 forced to add it draw from the contractor, I mean the  
3 actual pipeline contractor's manpower, which in that  
4 event he would not be prepared for. Therefore, his  
5 actual construction schedule, what he is assigned for,  
6 would suffer.

7 Q Let me come back to a  
8 point, Mr. Genest made. Your line comes from Mackenzie  
9 Delta south so you don't have the problem of building a  
10 line from Prudhoe Bay through permafrost, but you have a  
11 zone of continuous permafrost south to Fort Good Hope,  
12 approximately and you had discontinuous permafrost there-  
13 after. I hope what I've said so far is true.

14 I sometimes forget where  
15 that little line is on the map.

16 MR. GENEST. It's a little  
17 further north as I recall.

18 THE COMMISSIONER: The dividing  
19 line between continuous and discontinuous.

20 MR. GENEST. About Fort Good  
21 Hope.

22 THE COMMISSIONER: That's what  
23 I said.

24 But Mr. Genest said,  
25 if you're going to clear all this, in the year before you  
26 begin your first pipeline, and you leave those areas  
27 where you have ice rich fine grain soils, because you  
28 don't want to clear them and leave them exposed for a  
29 year or two, you may cause all kinds of problems for  
30 yourself, what -- I did n't quite understand, I didn't get



1 your answer to Mr. Genest, that means you aren't able  
2 to say now how many miles really you would clear, in  
3 that first year of -- in that initial year of clearing  
4 and you're not really able to say where you'd be clearing  
5 because you could find ice rich fine grained soils that  
6 had been permafrosted anywhere from Mackenzie Delta to  
7 virtually to the 60th parallel.

8 A That is essentially  
9 correct sir. But what we actually -- I merely make  
10 reference to is for instance sideslopes, what we try where  
11 there's ice rich soils, what we try to leave alone  
12 until prior to construction. In other words where  
13 we've got to provide a level working surface for the  
14 equipment so therefore, as Mr. Kosten pointed out  
15 before, makes it circumvented by shoo fly, strictly  
16 grading and access pipeline.

17 Q Tell me what shoo flies  
18 are again.

19 A A shoo fly is in typical  
20 construction terms, it also could be a ridge back for  
21 instance on highway construction. It's a bypassroad  
22 to overcome any steep gradients or for instance, you want  
23 to bypass a gulley or creek or something like that.

24 Q Suppose that you ran into,  
25 north of Fort Good Hope, an ice rich fine grain perma-  
26 frosted ground, that extended for 25 miles. What would you  
27 do, you would just leave that alone, would you, or would  
28 you only refrain from clearing where you had a slope or  
29 some other peculiar condition?

30 A The latter would be correct  
sir.





1 Q Oh. I see, so you would  
2 be leaving some extensive areas of ice rich fine grain  
3 permafrosted ground exposed for one or even two years?

4 A To some degree, sir.

5 WITNESS MIROSH:

6 A I think if I could  
7 qualify that, just briefly, the thought would be that  
8 we would like to leave it all until just prior to  
9 construction, the sensitive permafrost areas, but if it  
10 were a relatively flat area, then we would certainly  
11 consider putting an access road only through there rather  
12 than clearing the 120 foot, but the alternative to that,  
13 if there were slopes. would be to bypass the area.

14 Q Yes.

15 If I may just say this for the  
16 transcript, Mr. Scott, that's an area where you might  
17 have your staff consider appropriate terms and conditions.  
18 I know they are anyway, but just have it there in the  
19 transcript.

20 MR. GENEST:

21 Q Mr. Bauer, and well the  
22 panel, I'm just trying to understand what you mean by  
23 access roads. As a part of this clearing operation,  
24 ahead of construction. You're going to do that clearing  
25 operation the winter ahead. as I understand. is that  
26 right?

27 A That is correct.

28 Q And then you say that is  
29 going to provide you -- this is where I think I've lost  
30 you a little bit, you're going to, during that clearing



1 operation, provide access roads along the right of way?

2 A Yes sir.

3 Q What kind of road are  
4 we talking about?

5 A A simple construction  
6 road.

7 Q Which is going to last  
8 through the next summer and into the next winter?

9 A No sir, it won't. it's  
10 strictly a winter road. I think Mr. Jarvis will go  
11 into details on that later on.

12 Q Well I know about winter  
13 roads, that's not what has got me confused. But the  
14 access roads as I understand it/<sup>that</sup> you're talking about  
15 that you're going to prepare, in the winter, in which  
16 you're clearing the right of way is going to be a road  
17 alongside the right of way?

18 A No, it is within the  
19 right of way.

20 Q Well within the right of  
21 way, alongside the pipe trench?

22 A Yes sir.

23 Q And that is going to be  
24 a winter road?

25 A It could be a winter road,  
26 a gravel road, whatever the case may be.

27 Q You're going to then,  
28 I take it your plan then envisages building some kind of  
29 semi-permanent road that will last through next summer  
30 and will be of use to you during the next winter?



1 A Depends on the terrain  
2 because there are terrains where we don't have -- where  
3 we don't keep the road during the summer. It's strictly  
4 a winter access.

5 Q But in those terrains  
6 where you do, what are we talking about, a gravel road?

7 A Yes, in order to keep  
8 the road during the summer, you must put a gravel road  
9 in.

10 Q What do you plan?

11 A We have only guestimates  
12 at the present time.

13 Q Well may I have your  
14 guestimate, Mr. Bauer? I'll come back to you in a  
15 moment Mr. Mirosh. Do you have a guestimate, Mr.  
16 Bauer?

17 A I have not in front of  
18 me.

19 Q Can you help me then  
20 Mr. Mirosh?

21 WITNESS MIROSH:

22 A No, I was just going to  
23 add something to the comments made so far, and that is  
24 that one of the first things we'll consider in bypassing  
25 these sensitive areas, is the existing winter road which  
26 does run within a few miles of the pipeline right of way,  
27 assuming that's it's functional, and there's no reason  
28 to assume it wouldn't be as a means of getting between  
29 camps. What we have been talking about I think are  
30 possible alternatives to getting by the sensitive perma-





1 frost areas, and it would be our feeling that if we could  
2 use the existing winter road, this would be preferable.

3 Q But that existing winter  
4 road is not a road that alongside -- that is in your  
5 pipeline right of way, is it?

6 A No sir, but it is --.

7 Q That's what I'm talking  
8 about now, Mr. Mirosh.

9 MR. HOLLINGWORTH.

10 Let him finish answering the question.

11 MR. GENEST: Well I don't  
12 want him to -- you can ask him in re-examination if you're  
13 interested in that, I'm interested in the subject  
14 I'm talking about.

15 A I'm talking about the  
16 clearing of the right of way.

17 MR. GENEST: I'm talking  
18 about Mr. Bauer's suggestion that during the clearing  
19 of the right of way, there is anticipated to be some  
20 construction of gravel roads along or on the right of  
21 way. Now, you have said that that is something that  
22 might be done, is that right, Mr. Bauer?

23 WITNESS BAUER:  
A That is correct.

24 Q And I'm asking you if  
25 you have any idea at all how much of that you will be  
26 doing? Do you have a guestimate, I'm interested in  
27 your guestimate?

28 A Let's say I have no  
29 figures in hand yet.

30 Q Well, is this just an



1 idea that has popped into your head or have you any  
2 cost estimates or borrow requirement or possible borrow  
3 requirement estimates for this kind of operation?

4 A We make allowances for  
5 very preliminary estimates, based on the very pre-  
6 liminary subsurface investigations we have in hand.

7 Q Well what are those, do  
8 you have them?

9 A Well I would have to  
10 check with our geotechnical.

11 Q You're telling me that  
12 you do have them in writing somewhere, some allowance?

13 A No, I don't say we have  
14 it all in writing, we just made an allowance.

15 Q Well, you made some  
16 allowance, I take it, for the purpose of your cost  
17 estimates?

18 A Yes we did.

19 Q And what I'm trying to  
20 get at is what is the allowance? I know it may be  
21 rough because of the state of knowledge you're in, but  
22 I would like to know what it is?

23 A I have to defer that  
24 until we had a chance to review it

25 Q Until you have a chance  
26 to review what?

27 A I don't have that here.

28 Q You have it back somewhere?

29 A Yes.

30 Q Could you inform your



1 counsel, Mr. Hollingworth and perhaps he could let us  
2 know. You see I'm troubled with this because on your  
3 spread sheets you' show precise quantities of borrow,  
4 and I wonder if these are taken into account in any way?

5 A Those borrows deal  
6 primarily with backfill and so on.

7 Q So these borrow  
8 requirements don't have anything to do with what we're  
9 talking about now?

10 A They may and they may  
11 not.

12 WITNESS MIROSH.

13 A Well they do take into  
14 account access roads between wharves and the right of  
15 way. If that particular access road is shown on our  
16 landing sheets to be one which we wanted to be gravel,

17 Q Well do your alignment  
18 sheets show that?

19 A I think our alignment  
20 sheets do show some roads designated as temporary and  
21 some designated as permanent.

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1 Q Let's take a look, I just  
2 happen to have one in Volume 3, under Tab D3, and I have  
3 a sheet here that I happen to have picked out called  
4 "Construction Spread 1D".

5 A 1D or B?

6 Q 1D as in Daniel. Mile-  
7 post 44 to milepost 89.

8 THE COMMISSIONER: What was it  
9 again? Where are we?

10 MR. GENEST: I'm in Volume 3,  
11 Mr. Commissioner, and it's a pull-out sheet and if you  
12 look at tab D3, you will have a number of pull-out  
13 sheets, and it's about the -- the first is a master  
14 index map, sir; the second is construction spread 1D,  
15 which I suppose I might as well have picked, and I think  
16 the next one is 1D.

17 THE COMMISSIONER: Right,  
18 construction spread 1D, I have that.

19 MR. GENEST: That's right.  
20 It shows two things, it shows the Parsons Lake lateral,  
21 which I will ignore, I just want to deal with the main  
22 line, and on the top -- on the right hand side of this  
23 sheet, there is a table showing land use and resources  
24 requirement.

25 A Yes, we have that.

26 Q Now let's start at the  
27 top of that, it's spread 1D, and it's at milepost 45.1,  
28 it's a borrow area.

29 A Right.

30 Q And you have a figure as



1 to the area, 39 acres, and then you have a borrow in  
2 cubic yards, thousand cubic yards, and it shows it  
3 92,000 cubic yards of borrow is going to be required.  
4 Now what is that figure made out of? What do we read  
5 into that?

6 A Which figure?

7 Q 92, under 92,000 under  
8 borrow cubic yards. Do you see that column?

9 A Yes, yes.

10 Q And it's general fill.

11 A Right.

12 Q 92.

13 A Right.

14 Q Meaning 92,000 cubic yards?

15 A Right.

16 Q Now where is that used,  
17 that borrow?

18 A That would be for develop-  
19 ment of the borrow site which would have some facilities  
20 on it. That would be borrow which we would have to  
21 install some facilities on, which we wouldn't be able  
22 to utilize.

23 Q Okay. Then you have a  
24 compressor station, number C01, and --

25 A Right.

26 Q And you have 89,000 cubic  
27 yards?

28 A Right.

29 Q That goes right on the  
30 compressor station, doesn't it?



1 A That would be the pad,  
2 yes.

3 Q That's the pad. Now let's  
4 go to pipe trench and pipe grading, at milepost 4489.  
5 You have 49,000 cubic yards. What's that for?

6 A Is there a milepost  
7 associated with that?

8 Q Well it seems to be on a  
9 milepost.

10 A Oh yes.

11 Q It's along the whole  
12 road, I'm sorry --

13 A Milepost 40 --

14 Q -- along the whole road,  
15 it's 4489.

16 A 44 to 89, yes.

17 Q That's right, I'm sorry.

18 A Yes.

19 Q What's it for, sir, the  
20 49,000?

21 A That would be select  
22 material for padding, bedding, backfill.

23 Q That's then your total  
24 requirement, I take it, for the spread? I have ignored  
25 the Parsons Lake lateral here.

26 A Yes, that would be the  
27 requirement for milepost 44 to milepost 89.

28 Q Yes, and I take it  
29 there's no allowance then for access roads?

30 A Well there's a separate





1 item, I believe.

2 Q That's on the line -- I'm  
3 excluding the lateral there, Mr. Mirosh. I'm excluding  
4 the Parsons Lake lateral.

5 A There's an item called  
6 off ROW access.

7 Q But there's zilch for  
8 borrow there. Or do I need my ruler again?

9 A Okay, I guess that does  
10 indicate there's no borrow required for that, within  
11 those mileages, yes.

12 Q Nothing for right-of-way  
13 levelling? Nothing for access? Is that correct?

14 A Yes, there's an access  
15 road to the borrow site which is shown right under the  
16 borrow area. Yes, that doesn't show any gravel either.

17 Q That shows zilch too,  
18 if my linear vision is correct.

19 A Yes, I think that you are  
20 right.

21 THE COMMISSIONER: The Macken-  
22 zie Highway appears on this.

23 MR. GENEST: I will come back  
24 to that.

25 Q Do you foresee any neces-  
26 sity for right-of-way levelling in that area, Mr.  
27 Mirosh or Mr. Bauer or anybody?

28 WITNESS BAUER:

29 A That terrain is pretty  
30 flat.



1 Q That terrain is flat?

2 A Yes, sir.

3 Q Isn't it mostly side  
4 slope? Have you looked at the map?

5 A I was on the ground.

6 Q You were on the ground?  
7 You say there is no side slope?

8 A Oh, there's some side  
9 slopes.

10 Q How many miles?

11 A Would you repeat that  
12 question, please?

13 Q How many miles of side  
14 slope, roughly, do you have any idea?

15 A No.

16 Q Would you agree with me  
17 there's a substantial amount of side slope that would  
18 need some borrow?

19 A I don't follow your  
20 reasoning. You don't need borrow on the side slope.

21 Q I'm sorry, would you  
22 repeat that?

23 A I say I don't follow your  
24 reasoning. You don't need borrow on a side slope.

25 Q Oh I see, that's the  
26 trouble. Page 12 of your evidence, --

27 A Page 12?

28 Q No, page 12, question --  
29 the second page of question 12.

30 THE COMMISSIONER: 12 precedes



1 14, I think.

2 MR. GENEST: That's right.

3 Q He may have an unnumbered  
4 -- Mr. Bauer may have an unnumbered --

5 A Yes, I do.

6 Q Why don't we mark it now,  
7 Mr. Bauer, if you will and it might save a little time  
8 later. If you start at the top, or beginning of your  
9 evidence is page 7, and if you mark it there it will help  
10 us all. The next is 8, the next is 9, 10, and question  
11 12 appears on page 11, and it finishes on page 12.

12 A Right.

13 Q Are you with me?

14 A Yes I am.

15 Q And if I can read to you  
16 what you said at the top of page 12, and I quote:  
17 "Where extensive side slopes are encountered along the  
18 right-of-way, in order to facilitate safe operations,  
19 right-of-way preparation is required to provide a level  
20 working surface. This is accomplished by cutting and  
21 filling with the necessary preventative measures to  
22 avoid deterioration of the slopes. In such areas and  
23 in some instances it is anticipated that importing of  
24 granular materials may be necessary where sufficient  
25 material is not available within the immediate area,  
26 and to prevent deep cuts in the side slopes". And  
27 what are you going to do -- is that a measure you are  
28 going to take on this spread?

29 A Well that is throughout  
30 the spreads.





1 Q So I take it the answer  
2 to my question is yes, on this spread you anticipate  
3 taking that kind of measure?

4 A Not just on this spread.

5 Q Well I am just asking  
6 about this spread, Mr. Bauer.

7 A All right, then the answer  
8 is yes.

9 Q Right. And that's my  
10 reasoning, I'm asking you -- I have referred you to the  
11 fact that there are side slopes, and I'm asking you where  
12 you are going -- I'm putting it to you that you are  
13 going to need granular material if you are going to carry  
14 out the kind of practice that you describe on page 12.  
15 Now, is that agreed?

16 A The granular material may  
17 be found right on site, there.

18 Q It what?

19 A The granular material may  
20 be found right where we cut into that slope, that does  
21 not necessarily say we have to import granular material.

22 Q Well then you would do  
23 some grading there, would you, sir?

24 A You do some levelling,  
25 yes.

26 Q Is this not a sensitive  
27 permafrost area?

28 A Not all throughout.

29 Q It's not on the side slope  
30 areas. Can you say that categorically, do you?



1 A Nobody can say that right  
2 now for sure.

3 Q Well aren't we down to  
4 this sir, that you have got a probability of running  
5 into side slopes --

6 A Yes.

7 Q -- in that area?

8 A Yes.

9 Q That probably some of those  
10 side slopes will be in sensitive permafrost?

11 A Yes.

12 Q Probably then you will have  
13 to avoid grading?

14 A No, you have to cut into  
15 it, once you start pipelining.

16 Q You will cut into the  
17 -- well I thought that your -- I'm sorry, I'm lost  
18 again. I thought that your plan was to avoid this by  
19 filling?

20 A Well first you have to  
21 cut, you just can't fill. If you cannot avoid a side  
22 slope, you have to start cutting.

23 THE COMMISSIONER: Well I  
24 thought what you were saying here was that you wouldn't  
25 clear or grade until immediately before laying pipe,  
26 and that you would instead build what you called side  
27 trails around such areas during the clearing operation.  
28 That's what all of this conveyed to me, and I thought  
29 Mr. Genest's point was that if you were going to build  
30 the side trails you needed gravel, and you hadn't



1 budgeted for it, in construction spread 1D, figure  
2 3D-3.2.

3 A Sir, if I may respectfully  
4 repeat that to Mr. Genest. The direct answer to that  
5 specific spread here where there is actually no clearing  
6 or very little clearing required.

7 THE COMMISSIONER: Because  
8 we're in tundra, is that --

9 A Yes.

10 MR. GENEST:

11 Q What I'm talking about  
12 now is grading in the side slopes, and the necessity  
13 for fill. That's what I'm talking about.

14 A Yes, but you also pointed  
15 out that specific section, sir.

16 Q Yes.

17 A You wanted me to answer  
18 that on that specific section.

19 THE COMMISSIONER: Excuse me,  
20 Mr. Genest. I'm not sure that I'm not at cross purposes  
21 with both of you. I thought to build a side trail,  
22 you would need -- a side trail is kind of a road around  
23 the sensitive part of the right-of-way, isn't it?

24 A Yes, sir.

25 THE COMMISSIONER: And you  
26 would need gravel for that? I thought.

27 WITNESS MIROSH:

28 A We plan on utilizing snow  
29 roads, for these activities, where we can.

30 THE COMMISSIONER: All right.





Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Genest

1 Well now, Mr. Genest is talking about something else  
2 which is the fill you need in these side slopes. That  
3 is the gravel you need to fill in some part of the  
4 side slopes. That's what he's asking you about, as I  
5 understand it.

6 WITNESS BAUER:

7 A Yes, that was my under-  
8 standing.

9 THE COMMISSIONER: Well now,  
10 on this chart, does it show that you budgeted for borrow  
11 for the purpose he's discussed?

12 WITNESS MIROSH:

13 A Well we haven't budgeted  
14 for it here, sir, because I believe Mr. Bauer says it  
15 may be necessary, and it's something that will be deter-  
16 mined in the future.

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1 The obvious ideal way would  
2 be to create as little disturbance as possible, if the  
3 area is disturbed it should immediately be stabilized by  
4 proper stabilization and erosion control techniques.  
5 It may be that some gravel may be required but the intent  
6 would be to attempt to do it without disturbance.

7 Q Oh yes I understand that.  
8 I think we're talking now about whether the gravel is  
9 there and if it isn't there, where are you going to get  
10 it and so forth.

11 A Yes, we've allowed for  
12 gravel as Mr. Genest has pointed out, for the borrow  
13 site, and that amount of gravel, includes the access  
14 road, however long it may be to that particular site.  
15 But, we have not allowed for gravel on the right of way  
16 except for the bedding, padding and backfill material.

17 Q That's the heading pipe  
18 trench and pipe grading?

19 A Yes.

20 MR. GENEST: Q This access road, are you go-  
21 ing to use gravel for that? It's a temporary access road  
22 only isn't it?

23 A That's correct.

24 Q And how are you going to  
25 build it? With what material?

26 A Well which borrow site are  
27 we talking about?

28 Q I'm still back on  
29 spread---

30 A There are several borrow



1 sites in this area.

2 The dashed lines shown  
3 on this drawing which connect most borrow sites are  
4 temporary which would be snow or winter roads.

5 Q  
6 While we're on the subject  
7 of grading, I want to ask you some questions about your  
8 crews and I think there is in evidence, a document  
9 entitled Comments of Foothills Pipe Lines Limited on  
10 the Pipeline Application Assessment Groups. 56 questions  
11 and CAGPL's responses." Is that right, Mr. Scott. I've  
12 been in and out of here.

13 MR. SCOTT: I don't know what  
14 exhibit it is, but I think it's has been made an exhibit.  
15 Are you referring to the one headed comparisons?

16 MR. GENEST: No, I'm heading  
17 one entitled as I read it. Comments of Foothills  
18 on Paag's 56 questions and their responses.  
19 Do you have that Mr. Hollingworth?

20 MR. HOLLINGWORTH: I've been  
21 trying to find my copy.

22 MR. GENEST Why don't I leave  
23 that until after coffee then when everybody gets  
24 organized and I'll come back to it

25 MR. SCOTT: These, Mr.  
26 Commissioner, as you probably know are <sup>the</sup> documents which the  
27 Minister forwarded. I don't think they were made  
28 exhibits. That's obviously an oversight.  
29 They should be.

30 MR. GENEST: Well now that





1 we're mentioning them and they figure in the transcript,  
2 perhaps they could be made exhibits?

3 THE COMMISSIONER: Oh yes,  
4 certainly they should be marked.

5 MR. SCOTT: We don't seem  
6 to have any except Mr. Genest's to mark at the moment.  
7 I've got the one that is the comparison, he has the  
8 one that is the comments.

9 THE COMMISSIONER: Well at  
10 coffee Miss Hutchinson can sort it with the two of you  
11 and decide what number to give them. They are two  
12 documents are they?

13 MR. SCOTT: Yes, there were  
14 two and also reference was made to the minister's letter  
15 to Foothills at the same time and perhaps they should  
16 be filed

17 MR. GENEST: Sir, I wouldn't  
18 want to be taken for vouching for these comments in any  
19 way. I take it those are Mr. Scott's exhibits. Or  
20 somebody's exhibits.

21 THE COMMISSIONER: My exhibits.

22  
23  
24  
25 MR. GENEST:

26 Q Mr. Kosten, would you turn  
27 to page 16 of your prepared testimony sir.

28 WITNESS KOSTEN:

29 A Yes.

30 Q At the last paragraph



1 of that -- at the answer of question 20. which deals  
2 with how you arrived at the time sequence for construction.

3  
4 At the end of that page at the bottom of that page  
5 you come to the conclusion that the volume of work  
6 that could be reasonably accomplished in one season  
7 would be of the order of 50 miles on the northern end,  
8 to the order of 75 miles in the southern end, per  
9 season. I take it we should add to that, per spread.

10 A That's correct.

11 Q The average being about  
12 55 miles. Now I have a number of questions to ask you  
13 about that sir. The first is, what is the southern end.  
14 Where do we have 75 miles?

15 A North of the 60th  
16 parallel. Directly north of the 60th parallel.

17 Q Up to where?

18 A There is one spread that  
19 has 77 miles, spread 8.

20 Q For one season.

21 A That's correct.

22 Q Right. And then the  
23 next spread up from that has how many miles?

24 A I believe that it's a  
25 total of 125 over two seasons.

26 Q So some 62 and a half  
27 miles per season. would that be fair?

28 A I believe that's correct.

29 Q And that takes up up to  
30 where?



1 A That s up to spread five.

2 I'm sorry spread six.

3 Q It's in the spread  
4 sheet, but I'd like to know where. Can you just help me.  
5 I know I can read these in the spread sheets but --

6 A 3D3.0

7 Q I have it, it's illustrated  
8 on the coloured chart. 3D3.0

9 What factors have led you to  
10 predict that the southern end can do 25 miles more than  
11 the northern end?

12 A More daylight.  
13 And temperature conditions.

14 Q All right, I'd just  
15 like -- more daylight --

16 A More daylight and better  
17 temperature conditions. We're suggesting that the spread  
18 can do a greater number of feet in a day in that area.

19 Q Are those the two main  
20 factors?

21 A Yes.

22 Q And the temperature  
23 conditions sir, that you refer to, is it their effect on  
24 men and the ability of men to work?

25 A Yes, productivity.

26 Q That's productivity of  
27 -- sorry Mr. Mirosh, did you have anything to add?

28 WITNESS MIROSH:

29 A Well I was suggesting  
30 that equipment breakdowns might be less if the temperatures





1 were less severe.

2 Q Do you agree with that,  
3 Mr. Kosten?

4 WITNESS KOSTEN:

5 A Basically yes.

6 Q Basically yes?

7 A You have a tendency to  
8 have fewer equipment breakdowns if your temperature is  
9 not in the freezing range.

10 Q Mr. Jarvis. sir, could  
11 I take you to the sheets that we had at the end of  
12 Friday when I retired. There was about five of them as  
13 I recall, one was a table on white paper with just  
14 some numbers and the other was illustrated winter road  
15 construction schedules.

16 MR. JARVIS:

17 A Yes sir.

18 Q By climatic criteria.

19 Perhaps a few general questions  
20 before I ask that sir. In your prepared testimony,  
21 at question five, you're asked the question, after  
22 having it established that you provided technical  
23 advice to Foothills Pipe Lines -- page 22 we're at and  
24 we're at question five.

25 I'm bouncing around on you  
26 Mr. Jarvis and I apologize. I have a few general  
27 questions I want to ask about your written testimony.

28 Question five you say that  
29 as to the nature and scope of your advice, it was a  
30 preparation of a report and schedules, indicating the  
probable durations of snow and ice load availability



1 in various spreads throughout the pipeline route, when  
2 you refer to a report and schedule, have we seen it all  
3 here?  
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1 A The schedules are here,  
2 sir. The report was -- is in the process of preparation  
3 for Foothills.

4 Q It's not ready yet, is it?

5 A Not completed yet, sir.

6 Q When do you expect that  
7 it will be ready?

8 A Perhaps the end of this  
9 month.

10 MR. GENEST: Mr. Hollingworth,  
11 may we see that when it's ready?

12 MR. HOLLINGWORTH: Yes.

13 MR. GENEST:

14 Q Page 24, Mr. Jarvis at question  
15 11, when you are asked the question, "What constitutes  
16 a properly constructed winter road?", you give the  
17 answer, "One that has sufficient depth and density of  
18 frozen soil or snow to support traffic. It can be  
19 either frozen soil or compacted snow, or a combination  
20 of the two", and my interest is in the frozen soil  
21 winter roads. Are there stretches of this route where  
22 frozen soil, without snow compaction would be sufficient?

23 A Yes, sir, I believe that,  
24 yes.

25 Q Can you give me any idea  
26 where they would be? What the mileage would be, roughly?

27 A I wouldn't -- I don't  
28 have the information to give you a precise answer on  
29 that.

30 Q Then at page 13, at





1 question 13, you make a reference to the sufficiency---  
2 at question 12 you were asked about sufficiency of snow,  
3 and you make a comment about the first 10 or 20 miles of  
4 the line at question 13, to the effect that you consider  
5 snowfall records to be misleading in these more barren  
6 areas, due to wind sweep at recording stations.

7 How does wind sweep affect the  
8 record?

9 A Well as I understand the  
10 method of collecting snow data, a snow course is set  
11 forth and it's a very difficult -- it varies from year  
12 to year as to whether the wind affects sweeps the snow  
13 away from the station.

14 Q So would you then consider  
15 these snowfall records to perhaps understate the actual  
16 fall because it's swept away so quickly?

17 A Yes, I do.

18 Q Would it therefore follow  
19 then, sir, that the use of snow fences in these areas,  
20 might be of some assistance in gathering snow cover?

21 A I think that that could  
22 be an effective device in certain areas.

23 Q Now at question 14, sir,  
24 you discuss snow making --

25 THE COMMISSIONER: Excuse me,  
26 before you go on with that.

27 MR. GENEST: Yes.

28 THE COMMISSIONER: If the snow  
29 can be swept away thus resulting in the snowfall being  
30 understated, isn't the converse true? Couldn't it be



1 swept up against your gauge, or stick or whatever it is,  
2 and overstate it? Does that not work both ways?

3 A Yes it could, sir, the  
4 area -- having discussed this with people in Environment  
5 Canada, the general situation on the more barren areas  
6 is that there's a sweep of quite a lot of snow off the  
7 area into the treed areas.

8 THE COMMISSIONER: Into the  
9 wooded areas?

10 A Yes.

11 MR. GENEST:

12 Q So the weight of opinion  
13 is that it is understated rather than overstated?

14 A That seems to be the case.

15 Q At question 14, Mr. Jarvis,  
16 you make reference to snow -- artificial snowmaking  
17 equipment. Would I be right in concluding that the  
18 charts that you showed us, as to winter road construct-  
19 ion schedules, take no account of the use of snowmaking  
20 equipment?

21 A None, no.

22 MR. GENEST: Sir, I don't know  
23 if it's time for coffee or not, but --

24 THE COMMISSIONER: Yes.

25 MR. GENEST: -- this would be  
26 convenient for me.

27 THE COMMISSIONER: All right.  
28 Yes, well let's have our adjournment then.



(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. GENEST: Thank you Mr. Commissioner. I think we're missing a witness.

THE COMMISSIONER: Oh well. He's used to longer coffee breaks.

MR. GENEST: Mr. Jarvis then I think, Mr. Commissioner.

Q Mr. Jarvis, can we get out the yellow sheets entitled Spreads 3 and 4 and 5 that you introduced last Friday. I think you had a -- I'd just like to make sure that I've got the right legend on this. Starting at preparatory, the first block which is my sheet coloured sort of blue, bluish white --

A Yes.

Q -- is the earliest possible start according to your computations?

A That's correct, yes.

Q And the next one is the minimum probable?

A Early probable.

Q Oh, early probable.

A Yes.

Q All right. And then that little arrow that we see there with the -- next to that is the average?

A Yes.

Q And the next one is late possible, is that right?





1 A The next one should read  
2 late probable.

3 Q Late probable.  
4 That would be true of every  
5 other of those little blocks preparatory construction  
6 and all?

7 A Yes

8 Q Under preparatory work,  
9 I think you told me last Friday that was -- well perhaps  
10 you had better tell me again so I'm sure I understand it.  
11 What do you include under that classification?

12 A I did indicate that  
13 the preparatory work had to be related to the particular  
14 terrain or situation that you were dealing with.

15 Q But you related spreads  
16 three, four and five, as your best estimate of the  
17 range that we're faced with is that right?

18 A Yes.

19 Q So it's related here?

20 A Yes.

21 Q What does preparatory in  
22 that context mean?

23 A Preparatory may mean  
24 a number of operations, which, I think as I indicated,  
25 would assist in the construction phase and the performance  
26 of the winter road.

27 Q Can I have them please?

28 A Again, you have to relate  
29 them to particular terrain type but I would say that one  
30 thing would be ploughing of snow off the -- with light



1 equipment, off the ice. If you were intending any  
2 operations on the ice, you would remove the snow from  
3 the ice surface.

4 Q What ice surface? I'm  
5 sorry you've lost me Mr. Jarvis. We are on spreads 3,  
6 4 and 5 on this sheet, which is in the vicinity of  
7 Good Hope to Wrigley, about, is that fair?

8 A Yes.

9 Q And what ice are we  
10 talking about?

11 A Ice on the rivers or  
12 lakes that you were overcrossing.

13 Q I see. What about the  
14 right of way itself, apart from water surfaces, frozen  
15 water surfaces?

16 A There may be some areas  
17 of the right-of-way, non sensitive areas, wet areas, in  
18 which, once you had sufficient snow available. and it  
19 was cold that you could promote frost penetration by  
20 traversing the ground with low ground pressure vehicles.

21 Q That means you would send  
22 these low ground pressure vehicles along -- if it was  
23 cold enough, you'd send them along the right of way  
24 to compact the surface so that frost would go down  
25 deeper?

26 A Yes sir.

27 Q Is there anything else  
28 under that category?

29 A Those are perhaps the  
30 two major things in the preparatory work.



1 Q Well if you have an area  
2 of sensitive permafrost, Mr. Jarvis what would you--  
3 let's take that as an assumption, what would you include  
4 as preparatory work?

5 A At that time nothing.

6 Q Nothing at all?

7 A No.

8 Q Do I understand then that  
9 is saying that you do no preparatory work in sensitive  
10 terrain until you get to the actual construction stage.

11 A No. That's correct,  
12 yes.

13 That would be my suggestion.

14 Q All right, and you have  
15 that starting in -- preparatory work starting average  
16 late October?

17 A Yes.

18 Q Right. And then let me  
19 move on to construction then. What is involved in that?

20 A Well the construction  
21 operation is the phase at which you begin distributing  
22 snow in the areas which you want it and in levelling and  
23 beginning to compact snow.

24

25

26

27

28

29

30



1 Q And that again, your  
2 average start date for that would be the middle, about  
3 the middle of November, am I right?

4 A Yes.

5 Q And how long would it  
6 take you? Once you got your start date going, how --  
7 what rate of progress would you anticipate?

8 A Well the anticipated rate  
9 of progress is indicated by going to to the <sup>1.00%</sup> which  
10 is the next set of --

11 Q No, I don't mean that,  
12 I'm sorry, Mr. Jarvis, I'm not making myself clear.  
13 What's the rate of progress of a snow road? I mean, we  
14 start at the -- I suppose near the camp, or the com-  
15 pressor station pad and you build your snow road up the  
16 right-of-way, is that right, or down as the case may be?

17 A Yes, right.

18 Q And at how many miles, or  
19 how many feet a day or a minute or an hour, whatever  
20 way you want to put it, would you expect to progress  
21 normally?

22 A Well --

23 Q Once you have started?

24 A Yes.

25 Q Well I take it, perhaps  
26 the answer is -- would it be 45 miles in 30 days?

27 A That's roughly what's  
28 indicated on this particular chart.

29 Q I see, so that the gap  
30 between the average of construction, which is mid-November





1 and the average start of the haul, which is mid-December,  
2 is taking, by building about 45 miles of snow road?

3 A Yes, that's correct.

4 THE COMMISSIONER: Mr. Jarvis,  
5 the length of time, once you have got the thing built,  
6 the length of time that your winter roads are open,  
7 you described that as haul duration?

8 A Yes, yes sir.

9 THE COMMISSIONER: At the top  
10 end, that is the north end, it's about six months, and  
11 on the average it's about five months. That's what I  
12 glean from these charts. Is that about right?

13 A Yes, if you take the  
14 spreads 3, 4 and 5 as being sort of average, yes.

15 THE COMMISSIONER: Mr. Jarvis  
16 agrees with that.

17 MR. GENEST: Yes.

18 Q Now Mr. Jarvis, is there  
19 any reason why, having built a mile or two miles of  
20 snow roads, that you can't start your hauling along  
21 the stretch of snow road already built?

22 A Not if it's built to the  
23 standard that you require, certainly, yes.

24 Q So you don't need that gap  
25 of a month between the start of the construction of a  
26 snow road, and the start of hauling, if you start to  
27 build your pipeline as soon as you have got a sufficient  
28 length of snow road on which to move equipment?

29 A No sir, that extends the  
30 estimated time at which you would complete the entire



1 sector of road.

2 Q I'm sorry. Give me that  
3 again because I don't follow.

4 A That estimates the time  
5 at which the entire sector would be completed.

6 Q But you see, you have a  
7 start of haul on the 15th of December --

8 A Yes.

9 Q -- average, and what I'm  
10 putting to you is that as soon as you have got a mile or  
11 two of properly constructed snow road, which can start  
12 in the middle of November, you can start laying pipe?  
13 Now is that not so?

14 A That's correct, sir, yes.

15 Q Now if that is correct,  
16 then you would move your average haul duration, you  
17 would move it back very close to the middle of November,  
18 is that not so?

19 A No sir, not for every  
20 sector of the line. You build the road from one end  
21 generally, and the average date to start haul is the  
22 estimated time at which the road is all serviceable.

23 Q To start pipeline con-  
24 struction, do you need the whole snow road finished?

25 A No sir.

26 WITNESS KOSTEN:

27 A Let me take a crack at  
28 that --

29 Q Well let me finish with  
Mr. Jarvis, and then I'll go to you, Mr. Kosten, I'll



1 give you your opportunity. You agreed that it's not  
2 necessary, is that right?

3 WITNESS JARVIS:

4 A Not necessarily, no,  
5 that's right.

6 Q Now Mr. Kosten, did you  
7 want to add to that?

8 WITNESS KOSTEN:

9 A Unless you had to haul  
10 your pipe from an area that wasn't scheduled to go into  
11 that particular location, then you would need an access  
12 from wherever your pipe was.

13 Q Well that would, I  
14 suppose, entail the fact that you hadn't planned  
15 properly. If you put your pipe in one location and  
16 build a snow road from another location, then of course  
17 you couldn't haul the pipe over --

18 A That's assuming --

19 Q -- where there's snow  
20 road?

21 A That's assuming that you  
22 didn't plan on having your road complete.

23 Q Right.

24 If you planned to start your  
25 road from a place where your pipe is, and your pipe is  
26 there and you have planned and you have got your forces  
27 in place, would you not agree with Mr. Jarvis that you  
28 can start laying pipe as soon as you have got a length  
29 of snow road to go on?

30 A If you have your materials





1 there, that is correct.

2 Q Right.

3 A Technically you could.

4 Q Right. Well if you had  
5 an all-weather road from your wharf to your station,  
6 and your station is your stockpile and your stockpile  
7 is in place, it's not only technically you could do it,  
8 but it's practically you could do it, isn't that right?

9 A There are other factors  
10 that would enter into that decision, I would submit.

11 Q What are the other  
12 factors?

13 A The time of year, temper-  
14 ature, darkness, terrain conditions.

15 Q Well I don't follow that.  
16 Let me follow that up with you, Mr. Kosten. If you've  
17 got a prepared right-of-way surface, you've got your  
18 material over an all-weather road from your wharfing  
19 site onto your compressor pad, and you've got a snow  
20 road that's being built, is it not a practical proposi-  
21 tion to start laying pipe as soon as you have got a  
22 sufficient length of snow road to start moving?

23 WITNESS KOSTEN:

24 A Not if you have total  
25 darkness.

26 Q Can't you light the  
27 right-of-way?

28 A I suppose you could.

29 Q Isn't it quite a practical  
30 thing to light the right-of-way?



1 A It would not be my  
2 recommendation.

3 Q Why not?

4 A It's too dangerous. You  
5 have people working on your right-of-way.

6 Q Well Mr. Kosten, do you  
7 plan to build a pipeline around Inuvik in January?

8 A My recommendation that you  
9 would not start your pipe operations until you had  
10 sufficient daylight.

11 Q And when is that, in that  
12 area?

13 A About towards the end of  
14 January.

15 Q So you wouldn't do any  
16 construction at all?

17 A I didn't say we wouldn't  
18 do any, I'm talking about the firing up of the major  
19 spread. You can do a limited amount of work with  
20 lighting and on certain operations, but I don't believe  
21 that it is practical to fire up a complete spread to  
22 full progress.

23 Q Well what kind of  
24 operations do you have in mind, operations that you  
25 cannot light properly?

26 A Bending, coating.

27 Q You can't -- you say  
28 floodlights won't work there?

29 A I suppose theoretically  
30 it's possible to put in enough lights. I don't believe



1 it's practical.

2 Q Well have you had any ex-  
3 perience in trying to work with floodlights?

4 A We have had floodlights  
5 in certain operations, yes. We are talking about a  
6 whole spread here.

7 have  
8 Q And / the operations  
9 where you had floodlights working, worked satisfactorily?

10 A They did for that specific  
11 purpose, yes.

12 The answer another way  
13 possible, I cannot say that I have had any experience  
14 with lighting a complete spread. I don't know if any-  
15 body else has.

16 THE COMMISSIONER: What are  
17 the dangers in lighting the right-of-way? You said it  
18 was too dangerous.

19 A Well I'm speaking now of  
20 the physical aspects of it to the operators, to the  
21 people working with the equipment. The operator not  
22 being able to see a man standing some place, this sort  
23 of thing.

24 THE COMMISSIONER: You mean  
25 the --

26 A The safety aspect of it,  
27 is what I am talking about.

28 THE COMMISSIONER: You can't  
29 light it adequately anyway, that's your point?

30 A I believe that is what  
31 I am saying, yes, that there are areas where you can't



1 light it -- at least you have to put in so many lights,  
2 that I'm not sure that it is practical.

3 THE COMMISSIONER: I follow  
4 you, yes.

5 MR. GENEST:

6 Q Going back to you, Mr.  
7 Jarvis, I think that just before coffee break you said  
8 that none of these charts of yours or dates, had taken  
9 account of the use of snowmaking equipment, is that  
10 correct?

11 WITNESS JARVIS:

12 A Yes, that's correct.

13 Q And am I also correct  
14 that they don't take account of any snow harvesting  
15 activities that you might carry on?

16 A That's also correct.

17 Q And would you agree, sir,  
18 that disregarding the economics of it for a moment,  
19 I'll come back to those, that if the owner was prepared  
20 to pay whatever the economic penalty was, that by having  
21 equipment on place and ready to go, he could manufacture  
22 snow to augment the natural snowfall to allow heavy  
23 equipment on the right-of-way a good deal earlier than  
24 the dates you have shown here?

25 A A good deal, I-- it  
26 bothers me-----

27 Q Well earlier, let's not  
28 fight about adjectives, let's start with earlier first.

29 A Yes, earlier.

30 Q And would you not agree





1 with me that based on the temperature records that we  
2 have, that you could start to make snow in the latter  
3 part of October?

4 A That's possible, yes.

5 Q Isn't snowmaking, sir, a  
6 function of the water supply and the temperature you  
7 have got?

8 A Yes, sir.

9 Q And if you've got, at  
10 least my experience with ski clubs, you can lay down a  
11 fair bit of cover with adequate water and temperatures  
12 below 28 degrees, is that right?

13 A Yes.

14 THE COMMISSIONER: I think you  
15 had better take Mr. Genest on this outfit if you win  
16 the right to --

17 MR. GENEST: As long as the  
18 side slopes are challenging enough, sir.

19 Q Well sir, assuming that  
20 you could get a snow road by the use of snowmaking  
21 equipment and harvesting techniques, and that assumes,  
22 I take it, that you would have your equipment in place  
23 beforehand, and that you would be willing to pay a price  
24 to have that equipment there; would you agree with me  
25 that you could start constructing the snow road in late  
26 October?

27 A I couldn't give you a  
28 precise answer on that.

29 Q Well I suppose we are in  
30 an imprecise area, but what about your -- would it not



1 be reasonable -- would it be unreasonable, let me put  
2 it this way, to assume that you could do that?

3 A No, it would be possible  
4 to do that, yes.

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1 Q If that were so and you  
2 could construct a length of snow road there's no reason  
3 then why construction could not start almost immediately  
4 thereafter. I mean pipeline construction.

5 A I'm not qualified to  
6 answer that. I'm not an experienced --

7 Q Mr. Kosten, what do you  
8 say?

9 WITNESS KOSTEN:

10 A I'm sorry would you  
11 repeat the question?

12 Q Well, I've got to go back  
13 a bit. I say assuming that you can start making a snow  
14 road in late October, --

15 A Yes sir.

16 Q Would it not be reasonable  
17 to assume that you could also start constructing the  
18 pipeline shortly thereafter?

19 A Yes sir, if you had  
20 enough daylight.

21 Q With those assumptions  
22 sir, would not the month of November -- would not the  
23 month of November as a time to lay pipeline be preferable  
24 to the months of say January and February when the  
25 temperature is very much colder?

26 A If you had a proper base  
27 to work on.

28 Q Yes, assuming that.

29 A Yes, that's an assumption  
30 though.





1 Q And your productivity  
2 I take it in November would be higher than it would  
3 in January because of weather conditions?

4 A I expect so, yes.

5 Q I think earlier you told  
6 me, and I mean Mr. Kosten, you earlier told me that  
7 your schedules and your estimates of how much pipeline  
8 could be completed by a spread were based upon the  
9 assumption that pipeline construction would not start  
10 until January, is that right?

11 A Essentially that is  
12 correct yes.

13 Q And with those -- with  
14 the assumptions I've given you that you could start a  
15 snow road, you could have a snow road in place in early  
16 November, would that not add substantially to the  
17 productivity that you might expect?

18 A If a snowroad could be  
19 put in place at that period of time -- during that  
20 period of the year, yes. If you made that assumption.

21 Q Well if Mr. Jarvis feels  
22 it's possible, do you disagree with him?

23 A I have no experience with  
24 that kind of a snow road operation sir.

25 Q All right, so you're not  
26 in a position to disagree with Mr. Jarvis' judgment on  
27 that?

28 A That is correct.

29 Q Mr Kosten, when you came  
30 to these estimates of productivity, I think you told me



1 you had consultations with the contracting firm?

2 A Yes sir.

3 Q And I take it there was a  
4 degree of judgment involved in arriving at a conclusion  
5 as to how much a spread could build in one season?

6 A Experience, yes.

7 Experience and judgment.

8 Q There's no mathematical  
9 formula that you can apply?

10 A No sir.

11 Q I see sir that you,  
12 for instance, in the north end of your route, you  
13 counted about 50 miles as being the expected productivity  
14 is that right?

15 A Forty-five to 50, yes  
16 sir.

17 Q 45 to 50. Are you  
18 qualifying what you said at page 16?

19 At the bottom of page 16 you  
20 said "In the order of 50 miles".

21 A That's correct sir.

22 Q You say it's 45 to 50.  
23 would it be equally 45 to 55, the 50 being a reasonable  
24 figure?

25 A I believe the mainline  
26 spread is a total of 89 miles. Spread one that is.  
27 The mainline.

28 Q That's in two years?

29 A That's correct.

30 Q Now how many calendar days



1 do you consider the working season to be in the area of  
2 Inuvik?

3 A I believe it would be  
4 about 90 days.

5 Q How do you arrive at that  
6 sir?

7 THE COMMISSIONER: Excuse me,  
8 what does the 90 days represent.

9 A Calendar days for one  
10 spread operation.

11 Q You mean when they are  
12 actually laying pipe?

13 A Yes sir.

14 Q That's based on what you  
15 said earlier from late January to late April then?

16 A That's correct, end of  
17 April.

18 MR GENEST:

19 Q Would you start then  
20 in the Inuvik area at the end of January?

21 A Yes, the last week in  
22 January.

23 Q And you don't work in  
24 November or December because of what you consider the  
25 inability to get snow roads in place?

26 A That was not the reason  
27 that we did not start until late January.

28 Q The reason that you don't  
29 start in November, if that wasn't it.

30 A We can get the work done



1 as we have scheduled it by starting the operations after  
2 the new year basically.

3 Q Well that kind of leads  
4 me in a circle, Mr. Kosten. I want to know why you  
5 estimate such a low mileage and I suppose the more you  
6 shorten the season, the less mileage you'll get.

7 A That's correct.

8 Q I want to know what's the  
9 most you can get out of a spread, in a season where it  
10 is possible to construct and I'm asking you why can't  
11 you get your people starting to build in November, in  
12 Inuvik, what's the reason?

13 A We did not consider that  
14 we would need to work during that period, in the  
15 schedules that we laid out for Foothills.

16 Q Well then how can you say  
17 that's that's the most you can get? You're taking an  
18 extra season aren't you to build the line.

19 A Yes sir. I'm allowing  
20 sufficient time for the preparation of the right of way  
21 sir.

22 THE COMMISSIONER: Before we  
23 go on, I want to make sure that somebody covers this.  
24 I'm sure Mr. Genest will, but somewhere in here, on  
25 page 2, this is Mr. Mirosh. I'm not suggesting you  
26 deal with this now, Mr Mirosh, but I want somebody to  
27 deal with it. Page 2, paragraph 2. You said "Then  
28 Foothills considers that CAGPL have over estimated the  
29 productivity that is attainable under the circumstances.  
30 In fact, rather than the CAGPL project showing a better





1 productivity rate, it may well show a lesser productivity  
2 rate et cetera, et cetera. And you will recall, Mr.  
3 Mirosh, that you told me that that meant that CAGPL  
4 might in your view, take not just three but maybe four  
5 or maybe even five years of construction. I would like  
6 somebody to tell me, later on when you get around to  
7 it --

8 WITNESS MIROSH.

9 A Now is as good a time  
10 as any sir.

11 Q All right, whether that  
12 was based on the theory that you couldn't work north  
13 of the Arctic Circle say, couldn't lay pipe until  
14 January 1st?

15 A Well I think the points  
16 were mentioned, and we're making some assumptions that  
17 we're going to work in the dark and light the right-of-  
18 way, let's accept that. We're also making an assumption  
19 that we're going to build snow roads using snow making  
20 equipment and that the temperatures will be right, and  
21 the water will be there. let's accept that. If you make  
22 those assumptions and if those things are possible, then  
23 you might be able to get the season that is being proposed  
24 by CAGPL. On the other hand, if our advice is that it  
25 is dangerous to work with lighting, to depend on lighting  
26 for a great deal of the work, and if our advice is, from  
27 other people, is that snow roads at best are difficult to  
28 rely on and we're not -- we're proposing the use of  
29 snow making equipment for maintenance for making ice  
30 bridges, but to depend on this equipment for an early



1 start is a risk. Those are --

2 Q You're running the risk  
3 if you plan on starting on the basis that you have  
4 snow roads in place by November 1, you say that the real  
5 risk there and you feel your schedule is realistic, and  
6 CAGPL's isn't, since you are avoiding that risk. Am I  
7 putting your case fairly?

8 A Yes sir.

9 MR. GENEST:

10 Q I'm a little puzzled by  
11 that last exchange. Mr. Kosten, I thought you just said  
12 that you didn't plan your spreads around Inuvik because  
13 it wasn't necessary to plan any work in November and  
14 December. Did I hear wrong?

15 WITNESS KOSTEN:

16 A Sir if I may refer you  
17 to the --

18 Q Just tell me if I've got  
19 that right then you can refer me to anything you want.

20 A I'm sorry.

21 Q Did I hear you wrong in  
22 saying that the reason you didn't plan any work in  
23 November and December, in fact not till late January  
24 that it wasn't necessary to do the work?

25 A Well, we arrived at the  
26 conclusion as to when we felt it was practical to start  
27 the work. We did not consider starting work in November.

28 Q I want to come back to  
29 that. I want to come back to why you didn't consider  
30 it practical to start in November. But now you wanted



1 to refer me to something.

2 A It's the winter roads  
3 construction Mr. Jarvis' chart for spreads one and two.

4 The average condition there  
5 indicates that the -- about the first week in December  
6 first or second week in December, is when you can start  
7 your haul or start your pipeline constructioning.  
8 That's the middle bar at the bottom.

9 Q Right.

10 A That's the average  
11 condition.

12 Q Right.

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Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Genest

A I think that from the  
standpoint --

Q It's a little earlier  
in the middle.

A Well maybe the 10th.

Q Right.

A My contention is that if  
you started your operations on the basis of the average  
condition, this is a reliable method of scheduling your  
work.

Now, if you start your operations  
on that date, December it's almost total darkness.

THE COMMISSIONER: Excuse me.

Mr. Waddell, we'll adjourn about 5. Could I see you  
then? Thanks, carry on.

MR. GENEST:

Q Please go on, Mr. Kosten.

A During that period of time  
you have almost total darkness. I would not recommend  
starting a spread on that date.

Q Well I thought we just  
heard you say you weren't in a position to disagree  
with Mr. Jarvis, who would say it would not be unreasonable,  
if you were prepared to pay the cost penalty, to  
move back that start date by the use of harvesting and  
snowmaking techniques.

A I'm not disagreeing with  
Mr. Jarvis. I'm not qualified in the field that we are  
talking about here, as far as -- but that's what the  
chart shows, is average condition.



Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Genest

Q And his chart shows that you could start construction under average conditions about the end of the first 10 days in November, about November 10th if I read it right, and he's agreed with me and I think you have agreed with me, that you could start laying pipe very shortly after you got some length of snow road going.

A I didn't agree. It was based on the assumption you did have a snow road laid down.

THE COMMISSIONER: Mr. Kosten made that clear.

MR. GENEST: I'm sorry, sir?

THE COMMISSIONER: Mr. Kosten said yes, if you assume that then he goes along with the rest of it but he wasn't agreeing with the assumption.

MR. GENEST: Right.

Q Well let me -- I just want to see where the panel stands on this. Mr. Jarvis said it was not an unreasonable assumption. Now do you disagree with that?

A The chart shows that the average condition states about the 10th of December.

Q No, no, I'm talking about construction of the snow road. Now, the chart shows that you could start building a snow road without any artificial aid, without any harvesting, without any snow-making around the 10th of November, and Mr. Jarvis, in response to a question of mine, and I think you said you didn't disagree with it, said it was not unreasonable



1 to assume that you could push that back by the use of  
2 artificial methods.

3 A I see.

4 Q Now are we together so  
5 far?

6 A Maybe I'm misinterpreting  
7 the start here.

8 THE COMMISSIONER: Now are we  
9 together so far, Mr. Jarvis?

10 WITNESS JARVIS:

11 A Well yes I believe I said  
12 it was possible.

13 MR. GENEST:

14 Q Well let me go back then,  
15 Mr. Jarvis. Is it unreasonable to assume that if you  
16 are prepared to pay the cost penalty, in spreads 1 and  
17 2, and you are prepared to have your snowmaking --  
18 sufficient snowmaking equipment in place, you lay it on,  
19 you just order it by the dozens, and you are prepared  
20 to pay that cost; is it not reasonable to assume that  
21 you could start your construction of your snow road?  
22 I put it to you towards the end of October?

23 A It would be possible to do  
24 that sir, if you had the temperature conditions which  
25 would allow that.

26 Q Well let's look at the  
27 temperature conditions then, Mr. Jarvis. I guess we  
28 haven't got Inuvik, we got Aklavik. First of all, is  
29 Aklavik pretty comparable to Inuvik as far as temperature  
30 conditions are concerned?



Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Genest

A Well we can use them, yes.

Q They're not too far apart?

A No.

Q And I have the temperature and precipitation records from the Atmospheric Environment Service of the Department of the Environment of Canada. Well in fact I have got Inuvik at page 16 of that. Mr. Williams has given me the French. Are you bilingual, Mr. Jarvis?

A No.

THE COMMISSIONER: Too bad, Mr. Jarvis. You may have difficulty with these questions.

MR. GENEST: It's Mr. Williams' only concession that he has made to me.

MR. SCOTT: Just out of curiosity, is Mr. Genest suggesting that this hypothetical is Arctic Gas' case, because that isn't how I understood their evidence.

MR. GENEST: What's that?

THE COMMISSIONER: Well, that's an important point.

MR. GENEST: Doubly important because I missed it, sir.

MR. SCOTT: Well Mr. Genest has presented an interesting hypothetical to the panel. Is Mr. Genest suggesting that that's what Arctic Gas proposes to do, because if it isn't what they propose to do, it's an interesting but totally theoretical debate that is consuming some time.





Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Genest

MR. GENEST: What do you mean, starting in late October?

MR. SCOTT: Using, as I understand the hypothetical, making artificial snow as the means of building a snow road in spreads 1 and 2 --

THE COMMISSIONER: Bringing forward the date for commencing the building of a snow road..

MR. SCOTT: Right.

MR. GENEST: Well I thought our case, sir, as led by Mr. Williams, was that in the far north we would rely a good deal on snow fencing, but that we would be relying in many places on snowmaking equipment.

THE COMMISSIONER: But Mr. Scott's point, and my point is, was it your case that you would start pipelaying -- you see we have got that whole stretch from the international border to the Mackenzie Delta, and then -- that you would start pipelaying there in the -- at the beginning of November, which is what you are seeking to demonstrate as practical.

MR. GENEST: Sir, our case basically is that we would propose to start as soon as it can be practically done without damage to the environment. And our case is that if it can be done in -- by the use of the methods that I have put to the witness, we will do it.

THE COMMISSIONER: Well, I think we realize that. These gentlemen are saying, notwithstanding what the bar graphs indicate, that they



1 don't intend to start laying pipe until January 1st,  
2 and in Inuvik, just to take the northerly spread, the  
3 two most northerly spreads, they don't intend to start  
4 until late January owing to the darkness.

5 Now, on the strength of that  
6 they are saying that your whole schedule is wrong, and  
7 that you're on shaky ground when you say you can do  
8 this in three years. They say it will take you four or  
9 five.

10 MR. GENEST: That's right.

11 THE COMMISSIONER: Now, they  
12 say they can do it in two, even assuming they don't  
13 start in those most northerly spreads until late January.  
14 I was going on the basis, as you questioned these wit-  
15 nesses, that your case was that you could begin construct-  
16 ion, could begin pipelining by November 1, by bringing  
17 forward the date when the snow roads would be completed  
18 through snow harvesting and so on and so forth,  
19 and that that way, that you could meet that three year  
20 schedule that you had put before us?

21 MR. GENEST: That's right,  
22 that's right, sir.

23 THE COMMISSIONER: Well that's  
24 fine, that's what we are arguing about then.

25 MR. SCOTT: I only raised the  
26 question because I have been handed a clipping from the  
27 Globe and Mail which describes Mr. Genest's argument  
28 to Hydro, when he was trying to raise the hydro rates,  
29 and it's very critical of his argument, but it ends up  
30 with a general motto that might be applied, "Don't let



1 Pierre Genest Snow You In".

2 MR. GENEST: That sir, I  
3 consider a low blow.

4 THE COMMISSIONER: Did you  
5 expect any other kind?

6 MR. GENEST: I have heard many  
7 comments about Mr. Scott's arguments in the Court of  
8 Appeal representing a variety of clients, which shall  
9 not be described, and I shall not resort to the tactic  
10 of referring to the comments of other people on those  
11 arguments.

12 I do my best there for one  
13 client, and I'm trying to do another job here for  
14 another.

15 THE COMMISSIONER: And circum-  
16 stances alter cases, we all know that.

17 Before we go on though with  
18 this, Mr. Scott, just so that it isn't overlooked, this  
19 dispute between the two companies about how much work  
20 you can do in the middle of winter. You might consider  
21 having somebody on the Inquiry staff go to Alaska and  
22 find out what they did, or call in witnesses from Alaska  
23 to tell us what they did. They must be trying to build  
24 something in the middle of winter, notwithstanding the  
25 darkness and the safety factor, a very important factor  
26 that Mr. Kosten raised, and if they are, what's going on.  
27 Is it working out or is it not working out?

28 I know you will appreciate my  
29 raising that question, because this is important.

MR. SCOTT: It's noted.





1 MR. GENEST: Well I will pro-  
2 bably be calling rebuttal evidence on this, sir. Mr.  
3 Williams has had some experience with the Alyeska  
4 people, I'm told.

5 THE COMMISSIONER: That's  
6 fine, that's fine.

7 MR. GENEST: I'm told they plan  
8 to lay about 150 miles of small diameter line this  
9 winter on the north slope.

10 THE COMMISSIONER: All right,  
11 well by the spring we'll know what's happening.

12 MR. GENEST: That's right.

13 Q I was in the French  
14 temperature records of Inuvik. Have you got yours, Mr.  
15 Jarvis, and your record?

16 A Yes I have.

17 Q The only person that hasn't  
18 is me. If you look at the temperature records at page  
19 16 for Inuvik, we see that the minimum daily -- mean  
20 daily temperature for the month of October is 19 degrees.  
21 Do you agree?

22 A Yes.

23 Q And would that not --  
24 in fact, well let's go on, November is minus -- the  
25 maximum mean daily temperature is 25.1, and the minimum  
26 mean temperature, daily mean temperature is 12.8.

27 In November, the same numbers  
28 are minus 5.1 degrees for mean temperature, plus 2.3  
29 degrees -- and these are all Fahrenheit, for maximum and  
30 minus 12.4 for minimum. Now, would you not agree with



A      No sir.

THE COMMISSIONER: Well in October, the mean daily temperature is 19 degrees Fahrenheit. That is cold enough for snow. What is the problem? Not sufficient precipitation?

A        The problem, sir, is in the freezing of the ground, and various observers have indicated these climatic criteria given by Table Y, and I believe them to be reasonable parameters to work with.



1 MR. GENEST: Table Y, oh yes,  
2 that's at the end of your evidence.

3 Q What is the theory behind  
4 that, Mr. Jarvis? The number of degree days?

5 A The theory is merely  
6 observation of an emperical data indicating what are  
7 favourable conditions, what conditions are favourable  
8 to the construction of winter roads.

THE COMMISSIONER:

9 Q Well, Mr. Jarvis -- excuse  
10 me again, you're saying that it isn't just a combination  
11 of the temperature and the precipitation necessary to  
12 produce snow, naturally there's a third factor, and  
13 that is the freezing of the ground and that is why  
14 you're rejecting October, is that where we're at?

15 A Yes that's correct sir.

16 MR. GENEST:

17 Q Well rejecting it for  
18 what? I think we have to understand -- you see, on  
19 these -- let's take your degree days in October at  
20 Inuvik. My calculation would show that there are 202  
21 degree days, in October, using the maximum, using the  
22 mean, what do we do, we deduct 32, we deduct 19 degrees  
23 from the 32 degrees, is that right?

24 And then we multiply by 30 to  
25 arrive at the degree days?

26 A That's what I --

27 Q That's 390 degree days,  
28 is that right?

29 A Yes.

30 Q And that's shown on your



1 table Y as sufficient for preparatory work?

2 A Right. Preparatory.

3 Q Does that allow you to  
4 go on the ground with soft track vehicles?

5 A Yes. On certain ground.

6 Q So that you could at  
7 least start to manufacture snow. You could get snow  
8 making equipment on soft track vehicles onto the right-  
9 of-way, with that amount of snow?

10 A Yes, you can do that.

11 Q Right.

12 A Yes sir.

13 Q And then for construction,  
14 construction of the road, on Table Y again, you need  
15 between 550 to 750 degree days? Am I correct?

16 A Yes.

17 Q And you accumulate these  
18 pretty quickly in November, would you not?

19 A Well the records I have  
20 here, the particular records indicate that you would be  
21 short of the 550 degree days.

22 Q In October? I agree with  
23 you in October, you've only got 390. But what I'm  
24 putting to you, that having regard to the mean temperatures  
25 in November, you would accumulate the degree days required  
26 on your theory to start construction fairly early in  
27 November?

28 MR. HOLLINGWORTH: That's what  
29 the chart shows, the yellow chart.

30 MR. GENEST: Thank you Mr.





1 Hollingworth, do you want to take the Bible in your right  
2 hand?

3 Bear with me. I'm very slow  
4 and ignorant.

5 A Do you agree I guess,  
6 Mr. Hollingworth answered the question.

7 THE COMMISSIONER: This is  
8 only Monday. Things are deteriorating rather more  
9 swiftly than they usually do.

10 MR. GENEST:

11 Q Do I understand by your  
12 table Y, Mr. Jarvis, you're saying that in the area where  
13 you can't accumulate 32 1600 degree days I'm looking  
14 at your haul figures.

15 A Yes sir.

16 Q And I think you said  
17 in your testimony you're using the right hand column.

18 A That's correct.

19 Q As your criteria.

20 A Yes sir.

21 Q So that in areas where you  
22 can't accumulate 2.000 degree days below 32 degrees,  
23 Fahrenheit, and 8 inches of accumulated snow, you can  
24 never really have a satisfactory snow road?

25 A I don't think you can  
26 build a base to carry the traffic volumes that have been  
27 indicated to me.

28 Q Thank you sir.

29 Have you ever had any experience,  
30 Mr. Jarvis, in building snow roads with what is known as



1 a pulvimixer?

2 A No sir.

3 Q Do you know the character-  
4 istics of such a machine?

5 A Yes sir.

6 Q Have you perused during the  
7 report filed by Arctic Gas in these proceedings of  
8 relating to snow roads at Inuvik?

9 A I read some of those  
10 reports sir. Some reports.

11 Q Well as I recall those  
12 reports I'm trying to recall Mr. Williams presentation  
13 here, a snow road was constructed in Inuvik in November  
14 and it was pulvimixed and it was, demonstrated by their  
15 experimentation there that it could carry heavy traffic  
16 quite satisfactorily. In fact, Mr. Williams told me  
17 20 or 24 hours around the clock. 24 hours, my coach isn't  
18 very clear, 24 hours after the surface had been laid  
19 down, and pulvimixed.

20 THE COMMISSIONER: Did you read that evidence,  
21 Mr. Jarvis?

22 A No, I haven't read that  
23 in total sir.

24 MR. GENEST:

25 Q Are you not in any  
26 position to comment on the conclusion of Canadian  
27 Arctic Gas?

28 A No, not without specific  
29 details.

30 THE COMMISSIONER:

Q You might read it over  
the supper adjournment and comment if you wish, I'd like  
to hear your comments.



1 A Yes.

2 Q Mr. Williams, I'm sure  
3 can find the reference. I'm sure I can't. I remember  
4 that evidence.

5 I think Mr. Williams discussed  
6 the test site at Norman Wells where they had trucks  
7 going round and round.

8 MR. GENEST: I think we'll  
9 move off that subject and get into a few odds and ends.

10 Q Mr. Mirosh, you have  
11 referred to the fact that the principal difference in  
12 this aspect of the construction plan between Arctic Gas  
13 and your proposal is your avoidance of the use of  
14 airstrips and fixed wing aircraft and the fact that you  
15 plan to use helicopters?

16 WITNESS MIROSH:

17 A Yes, that's one of  
18 the differences.

19 Q Have you estimated how  
20 many helicopters would be used for each spread sir?

21 A Yes sir, in our  
22 calculations we've used two heavy lift helicopters and  
23 one small machine, per spread.

24 Q What's the size of the  
25 heavy lifts, can you help me there?

26 A Well it would be one of  
27 the smaller heavy lift machines, specifically the S-61  
28 is what we've looked at. It's capable of carrying  
29 payload plus a crew of in excess of 10,000 pounds, but  
30 we've used four tons as the capacity





1 Q How many flights a day  
2 would you be planning, during construction?

3 A We've estimated 16 hours  
4 flying time per machine per day which to us is quite  
5 conservative. In other words, that's a lot of flying  
6 hours.

7 Q Do you know if helicopters  
8 can operate in icing conditions sir?

9 A Well I'm not a helicopter  
10 pilot but we have been flying in machines up here in  
11 much weather. I suppose there are certain atmospheric  
12 conditions that would limit helicopters as they would  
13 other machines.

14 Q Have you made specific  
15 inquiries into the capability of helicopters to operate  
16 in icy conditions?

17 A What would icing be  
18 defined as?

19 Q Well the same icing that  
20 would affect aircraft flying if you didn't have equipment  
21 to deal with the icing?

22 Let me give you my  
23 understanding which may be quite wrong. I understand  
24 that icing is a critical factor for helicopters because  
25 it affects the balance of the rotor wheels and that  
26 there is no equipment devised yet to deal with that  
27 condition. Am I giving you news?

28 A Well I've never been  
29 in a helicopter when it's been under icing, but that  
30 may well happen yes.



1 Q Well do you know if these  
2 helicopters you plan on operating will be able to operate  
3 in instrument flight rule conditions, I mean when  
4 visibility is bad?

5 A These particular machines  
6 do have that capability, or can be -- they can carry  
7 instrumentation.

8 Q Well do you plan to have  
9 them equipped?

10 A Yes.

11 Q And do you plan to put in  
12 instrument flight rule equipment at your helipads?

13 A We plan on having a beacon  
14 at the helipads.

15 Q Well, there you have me.  
16 Is there a difference between IFR equipment and a beacon?

17 A Well it wouldn't be  
18 totally IFR such as would require a man on the site to  
19 operate IFR equipment, as I understand it.

20 Q Well you do not plan to do  
21 that?

22 A Well we plan to have a  
23 beacon which would allow certain flight, but under zero  
24 elevation we would not fly.

25 Q And have you estimated  
26 how many days your camps would not be serviceable if  
27 you didn't -- if these flying conditions were such that  
28 they required IFR equipment?

29 A Well we do have a winter  
road which we understand has been in operation for the



1 last five years. I shouldn't say we have it, it has  
2 been a road that's been in existence, and this would be  
3 supplementing the helicopter transport.

4 Q Sir, could you tell me if  
5 your plans, to the effect that you will have no air  
6 strips, change if the Mackenzie Highway is built only to  
7 Wrigley?

8 A No, sir, that's our cur-  
9 rent assumption that the highway would be to about where  
10 Wrigley is located.

11 Q And that doesn't change  
12 your plans as to air strips? The fact that there will  
13 be no Mackenzie Highway beyond?

14 A No sir.

15 Q Or the assumption that  
16 there will be no Mackenzie Highway beyond Wrigley?

17 A Yes, that's right, they  
18 won't change, but there is this winter road as I would  
19 emphasize, which would serve the same purpose as the  
20 Mackenzie Highway for us since our construction is during  
21 the period when the winter road would be useable.

22 Q Let me now go back to the  
23 question of clearing and grading, and I was going to  
24 refer you to something that's now been made an exhibit,  
25 and that is your responses to -- comments on the Pipe-  
26 line Application Assessment Group's 56 questions, and  
27 Arctic Gas' response. Would you have that in front of  
28 you sir?

29 A No, we don't.

30 MR. GENEST: Mr. Hollingworth,



1 were you able to find that?

2 MR. HOLLINGWORTH: No I wasn't.

3 MR. GENEST: Well we are no  
4 farther ahead.

5 Q You have made a comment  
6 in response to PAAG question number 2, as to the number  
7 of crews, and the manpower composition of crews, and  
8 you have shown a clearing and grading crew of 206 per-  
9 sons, and a pipeline installation of 459 persons. Do  
10 you have that there?

11 A Yes, I have the clearing  
12 and grading.

13 Q The next one follows it,  
14 the 459 follows immediately after.

15 A Yes, you have your own  
16 totals here which we didn't supply.

17 Q I am told they are your  
18 totals.

19 A They are --

20 Q I don't suppose we will  
21 quarrel with totals.

22 A Okay. Yes there is a  
23 total at the end here.

24 Q A total at the end?

25 A Yes.

26 Q Perhaps I should say that  
27 the equivalent numbers for the Arctic Gas crews are  
28 a clearing and grading crew of 63, and to which should  
29 be added some 30 people for machine clearing, so the  
30 equivalent number for your 206 in the Arctic Gas people





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1 would be 93, and I would like to know in what areas and  
2 what seasons of the year would the clearing and grading  
3 crew of 206 persons that you have described, be working?  
4 Can you help me on this?

5 WITNESS KOSTEN:

6 A I think perhaps I can  
7 answer that one.

8 Q Thank you, sir.

9 A All of our work is contem-  
10 plated to be <sup>done in the</sup> / winter, whichever season. By that I  
11 mean, first, second or third.

12 Q So that's a crew that  
13 stays over the -- stays as a sort of regiment or  
14 battallion ready to go working throughout the whole  
15 construction phase?

16 MR. MIROSH: A I'm not sure I interpret  
17 you correctly but they come in and out every winter.

18 Q Well how is this crew --  
19 I'm just puzzled at the large difference between the  
20 two. What work is it going to be doing?

21 A Which crew are you speaking  
22 about now?

23 Q Your crew of 206 persons  
24 that you have shown as the clearing and grading crew?

25 A Clearing and right-of-way  
26 preparation.

27 This is the felling of the  
28 timber, disposal if this is what is required in that  
29 particular area, and the right-of-way preparation.

30 Q And is that intended to



1 be during the full length of the right-of-way, subject  
2 to what you have told me about tricky areas?

3 A It would start at one end  
4 of each spread during -- or possibly in one or more  
5 locations and work to the end of that spread, yes.

6 Q And that would include  
7 work in the boreal forest?

8 A Yes.

9 Q Now we have already  
10 established, I think that your application shows that all  
11 of the clearing is to be done in one year.

12 A That is correct.

13 Q Well do I take it then  
14 there would be eight of these clearing and grading crews?

15 A Yes.

16 Q Each completing two  
17 spread sections in one year?

18 A On the clearing and right-  
19 of-way preparation operations, yes.

20 This is the way we have it set  
21 out. It is not mandatory to do the operations in one  
22 year, but this is the way we have set it out.

23 Q Would you turn then in the  
24 application, I just want to get these figures straight,  
25 and I'm sorry this is very boring. Figure 3D13, 1977,  
26 that's in volume 3 or part 3 after the tab D1, just  
27 around the bar charts we were talking about a little  
28 earlier?

29 A I'm sorry, what is the  
30 reference number?



1 Q It's chart, Figure 3D13,  
2 and it's page 3D19.

3 A Yes, sir.

4 Q Are you with me -- it's  
5 the third chart after the bar chart, the second chart  
6 after the bar chart.

7 A Right.

8 Q And it's headed "Manpower  
9 Requirements for Typical Spread, Pipeline Construction  
10 Only", and you have in '77 clearing, and you have man-  
11 power and the chart there shows 120 people?





1 I'm trying to reconcile that  
2 with what you told Paag that you would have a clearing  
3 and grading crew of 206 people. Which is the right  
4 one?

5 A Well the clearing number  
6 is 112 on table two, of the document which you're  
7 referring to.

8 Q Yes. Is that 206?

9 A Well the number for  
10 clearing is 112, on this document, and in the application  
11 it shows about 120.

12 Q So that clearing here in  
13 1977 does not include grading?

14 WITNESS KOSTEN:

15 A I think the answer to  
16 that one sir is its a matter of interpretation and it  
17 depends on which spread you're in. In some spreads there  
18 is no clearing. I believe these would be average  
19 figures.

20 Q So there's no necessary  
21 relationship between the two?

22 A I wasn't involved in the  
23 preparation of the break down but I believe that is  
24 a fair answer.

25 WITNESS MIROSH:

26 Grading is shown on chart  
27 3D1.9 within the main construction spread numbers.  
28 You will see there is a little blip at the top, and  
29 a notation grading complete which lasts some two to three  
30 months and then the manpower number comes down.

Q It goes down by about 20



1 doesn't it?

2 A That's probably about  
3 what it shows, yes sir.

4 Q So if I add that 20  
5 onto the clearing, I get 132. I'm just trying to get  
6 some consistency between -- maybe I'm looking for some-  
7 thing that ought not to be consistent. You have 206  
8 clearing and grading in your Paag comments and we have now  
9 got to about 120?

10 A Yes. It's just been  
11 pointed out to me that the table 2 which you're  
12 referring to, is a specific spread, whereas 3D1.9 is a  
13 typical spread. There will be some differences and  
14 in addition to that, there are on table 2, there is a  
15 group called supervision, group called servicing and  
16 equipment repair, and a group called clearing and a  
17 group called grading. So the 206 adds all of those  
18 four groups up, but the clearing and the grading is  
19 a lesser number.

20 Q If I could turn to you  
21 for a moment sir. At page 8 of your testimony, just  
22 a small point but it made us curious, have you got that  
23 sir?

24 WITNESS BAUER:

A Yes.

25 Q In the answer to question  
26 11, you're telling us all about the standard procedure  
27 of winter pipeline construction and in paragraph D on  
28 page 8 talks about bending. You say that bending usually  
29 requires pre-heating of the pipe at the point of bending?

30 A Yes.



1 Q I'm told by by my  
2 advisors that's it's rather unusual to heat pipe, do  
3 you mean to say that that's done as a regular practice?

4 A Yes, in construction.

5 Q Where is that done sir?

6 A Well it's done during the  
7 winter construction.

8 Q No, where in your  
9 experience have you seen that done? What contractors,  
10 what pipe?

11 A We did it in Europe.

12 Q In Europe?

13 A Yes.

14 Q Have you seen it done in  
15 North America?

16 A Not personally.

17 Q Have you heard of it being  
18 done anywhere?

19 A Yes.

20 Q If so where?

21 A I can't recall any  
22 specific sites,

23 Q Mr. Kosten, have you ever  
24 done any pre-heating?

MR. KOSTEN:

25 A Yes sir.

26 The reference here is in  
27 winter construction. You don't do it in the summertime.

28 Q Where would you do that?

29 A We've done it on winter  
30 jobs for Peace River Oil Pipeline, --



Q I'm sorry the what?

A Peace River Oil Pipeline  
in Northern Alberta.

Q Would you describe it as  
a usual practice sir?

A It depends on the  
characteristics of the pipe, the metallurgy, but for  
winter construction, when you get down to lower  
temperatures, where you are constructing at below  
zero temperatures, then this can be called as a require-  
ment, yes.

Q I notice at page 3D2.8  
that's under Tab D-2 of your volume III or your part III,  
under bending, you just talk about cold bending.

Could we have your  
reference again please?

MR. GENEST: I'm sorry it's  
3D2.8. And it's pages -- under Tab D-2.

A Yes sir.

Q The title is 2.3.6  
bending, cold bending of the pipe during construction  
will be required, to fit the pipe to the alignment and  
contour of the ditch and so on?

A Cold bending -- the  
reference here is to the cold bending procedure which  
is a procedure in the field. A hot bend, where an  
extreme angle is required could possibly be  
require oven bending and would have to be done in a  
shop.

Q Do you intend to pre-heat





1 on this project for bending?

2 A I believe it would be a  
3 requirement. I don't know whether it -- what the client  
4 has here in terms of specification, but I believe that  
5 it would be requirement.

6 Q Mr. Mirosh?

7 WITNESS MIROSH:

8 A I would have to check  
9 with our metallurgy people to check that statement.

10 WITNESS KOSTEN:

11 A I would qualify my  
12 statement that it's under certain conditions, mainly  
13 temperature. If the temperature is such that preheating  
14 of the weld is required, then I would assume that heating  
15 of the bending process under that same condition would  
16 be required.

17 Q Is that what was done in  
18 the line that you've just described?

19 A Yes sir.

20 Q At page 20 of your  
21 testimony. Mr, Kosten, just another small matter,  
22 in answer to question 22, I won't be very much longer,  
23 Mr. Commissioner.  
24  
25  
26  
27  
28  
29  
30



1 I am sure you think these  
2 are quibbles. The second paragraph of the answer, I  
3 wonder if there is a mistake there. If not, I am going  
4 to have to ask some questions about it. You say "Our  
5 assessment", and I quote, "Our assessment of the project  
6 is that approximately one-half of the project, namely  
7 the southern half, conventional ditching techniques will  
8 be employed and special techniques will be required in  
9 those areas that are classified as", and it says  
10 "discontinuous permafrost".

11 Now should that read "contin-  
12 uous", or --

13 A Where you have continuous  
14 permafrost in areas that are considered as discontinuous.  
15 I'm talking basically about --

16 Q You are talking about  
17 permafrost?

18 A -- the state of permafrost.

19 Q The state of permafrost?

20 A Right.

21 Q So those special techniques  
22 then are described on page 21?

23 A Yes.

24 Q And you describe there a  
25 modified blasting technique?

26 A Right.

27 Q Can I ask you about what  
28 the word "modified" means there?

29 A Modified as compared to  
drilling in solid rock, drilling and blasting in solid



1 rock.

2 Q And how does it differ?

3 A Smaller charge. Smaller  
4 unit charge. That is the powder per cubic foot of  
5 material.

6 Q Can I read from the answer  
7 to that question, or can I infer that about half of your  
8 line, in your view, will require modified blasting?

9 A That is correct.

10 Q And is that the assumpt-  
11 ions that you have made in your cost estimate about  
12 blasting?

13 A That is correct.

14 Q And I take it, Mr. Bauer,  
15 you don't disagree with that?

16 WITNESS BAUER:

17 A No I don't.

18 Q Now in response to quest-  
19 ion 11, if you will turn to question 11, let me find  
20 question 11; Section G ditching, and Section J, blast-  
21 ing, at least the backfill and cleanup. Towards the  
22 end of G you talk about padding. Now padddding, as I  
23 understand, and correct me if I am wrong, is just fill-  
24 ing with backfills, borrow material if you can't --

25 WITNESS KOSTEN:

26 A Normally it refers to  
27 selective backfill material.

28 Q Yes. And in J it refers  
29 to padding again. You say -- I've got the page 10,  
30 "If the ground has be/ <sup>come</sup> frozen for some reason, padding





1 of the pipe with fines is necessary" --

2 A Yes sir.

3 Q -- "to prevent damage to  
4 the pipe and coating". Now if you were going to use  
5 modified blasting, are you not going to have to bed the  
6 bottom and -- of the ditch and pad the pipe?

7 A It would depend on the  
8 type of material, yes, I would expect that you would be  
9 faced with that condition.

10 Q And would that -- I take  
11 it that since you expect half your line to require this,  
12 would you not require quite a quantity of padding  
13 material?

14 A Yes, sir.

15 Q Have you estimated the  
16 quantity of this material?

17 A I believe it has been  
18 estimated, yes.

19 Q By you?

20 A No sir.

21 Q Who has, can anybody on  
22 the panel help me on this?

23 WITNESS MIROSH:

24 A I believe it's shown on  
25 our construction spread sheets, under an item called  
26 "Pipe Trench".

27 Q On your spread sheets?  
28 Give me that again, Mr. Mirosh.

29 A Yes I believe it's shown  
30 on our spread sheets in the upper right hand corner



under "Land Use and Resource Requirements", under an item called "Pipe Trench and Pipe Grade".

Q Well we were on 1D before. Why don't we go back to that? That's where I would find it, eh? Spread 1D, sheet 3D32? The one we were discussing previously?

A Yes, I have it.

Q And we had an item there, under the heading, under the column General Fill, borrow cubic yards, thousand cubic yards, you have 49,000 cubic yards for pipe trench and pipe grading, is that correct?

A That's for the main line, that's right.

Q For the main line, yes. And would this include the padding that you would plan to use as a result of the blasting technique that you have described?

A Yes, it would include padding wherever we require it.

Q Well would it be fair to assume that there would be a lot of blasting in this section, which I notice is mostly in permafrost? It's in continuous permafrost, in fact.

WITNESS KOSTEN:

A I expect so, yes.

Q Would you say that half of the route would be blasted? Or the whole of it if it's all continuous permafrost?

A It would depend on whether



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1 it is continuous permafrost, sir. I don't want to infer  
2 that 100 percent of what is blasted would require select  
3 backfill, though.

4 Q Does this, your estimate of  
5 49,000 feet, take into account any requirement for  
6 blasting? Any amount of padding as a result of your  
7 blasting?



1 WITNESS MIROSH:

2 A Well I would have to  
3 assume since that's the number that we show that that  
4 is what we estimated we require for padding and bedding  
5 in that section which is some 45 miles long.

6 Q I'm putting it to you sir,  
7 that if this is in continuous permafrost, practically the  
8 whole route, according to your testimony, would require  
9 blasting? Do you agree or disagree with that?

WITNESS KOSTEN:

10 A practically the whole  
11 route?

12 Q Yes.

13 A No sir.

14 Q In this stretch. In the  
15 spread one D.

16 WITNESS MIROSH:

17 A Well, I believe it's  
18 as I understand it, it's a function of ice content in  
19 the soil and material which one finds along the route.  
20 And the effect which that would have on toothwear or  
21 equipment wear.

22 Q Well you told me earlier  
23 that you would expect half the whole route would have  
24 to be blasted. Now is that right or isn't it?

WITNESS KOSTEN:

25 A Yes sir.

26 Q This is the whole route  
27 from north of 60 right to the tip top of the pipeline?

28 A There may be some types  
29 of soil that are in a state of permafrost that will not  
30 require blasting.





1 Q I know but you've made  
2 the overall judgment that half would have to be blasted  
3 didn't you?

4 A This is the amount of  
5 money we put into our cost estimates to cover that  
6 eventuality.

7 Q And here we have, in  
8 spread 1.D an area which is entirely in continuous perma-  
9 frost. Now is it not reasonable to assume that if half  
10 the whole route is going to be blasted, because of perma-  
11 frost, an area that is entirely in permafrost is going  
12 to be mostly blasted?

13 A I said sir that --

14 Q Can you answer that  
15 question?

16 A You'll have to restate  
17 the question sir.

18 Q I say is it not -- when  
19 you have assumed that the whole route is going to be  
20 blasted, at least half the whole route from north of  
21 60, is going to be blasted because of permafrost, is  
22 it not reasonable to assume that in an area where you  
23 have continuous permafrost, most of that area is going  
24 to be blasted.

25 A No sir it is not. We  
26 don't know the state of soil condition. High ice content  
27 permafrost may not require blasting.

28 Q I see. It's a special  
29 kind of permafrost that is going to require blasting?

30 A Yes sir.



1 THE COMMISSIONER. What kind?

2 A Low ice content.

3 Q In mostly rock and soil?

4 A I beg your pardon?

5 Q Mostly rock and soil?

6 A Well the rock would have

7 to be blasted certainly. In permafrost, if you have a  
8 high ice content soil, I'm told that this -- it is possible  
9 that this could be trenched without blasting.

10 Q But if you have -- if the  
11 ground has a low ice content, that is it only consists of  
12 three things as I understand it, rock in one form or  
13 another or soil or frozen water?

14 A Right.

15 Q If you have very little  
16 frozen water, then what you've got left is soil and rock.

17 A Right.

18 Q That's what you've got to  
19 blast?

20 A That's correct.

21 MR. GENEST: Sir, I've blasted  
22 myself out of questions. I wonder if I could regroup  
23 over the supper hour. I don't think I'll be very long.

24 THE COMMISSIONER: Okay well  
25 we'll come back at 8:00 tonight and carry on then.

26 (PROCEEDINGS ADJOURNED TO 8:00 P.M.)

27

28

29

30



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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: I was given to understand Mr. Bayly wanted to go first this evening. Was that the arrangement?

MR. SCOTT: Mr. Genest hasn't finished, I don't think, has he?

MR. GENEST: I have just got a few minutes, Mr. Commissioner.

THE COMMISSIONER: Yes, go ahead.

MR. GENEST: I just learned today, sir, that it should really be Dr. Commissioner. Dr. Clark I think is arranging a presentation.

THE COMMISSIONER: Well thank you, Mr. Genest.

MR. GENEST: Well on behalf of all of us, may I offer our congratulations, sir?

MR. SCOTT: Before Mr. Genest carries on any further, perhaps I should put in the two documents that were referred to this afternoon.

THE COMMISSIONER: Mr. Scott obviously isn't impressed by the --

MR. GENEST: No.

MR. SCOTT: Well I am, Mr. Commissioner, but --

The first is called a "Comparison of the Foothills and Canadian Arctic Applications for Permit to Construct", dated July 7,





1 1975, and the second of the same date, and the one that  
2 Mr. Genest referred to is "Comments of Foothills'  
3 Pipe Lines Limited on the Pipeline Application Assess-  
4 ment Group's 56 Questions and CAGPL's responses".

5  
6 ( COMPARISON OF FOOTHILLS AND CANADIAN ARCTIC  
7 APPLICATIONS FOR PERMIT TO CONSTRUCT THE  
8 MACKENZIE VALLEY GAS PIPELINE, DATED JULY 7,  
9 1975 MARKED AS EXHIBIT 261)

10  
11 (COMMENTS OF FOOTHILLS PIPE LINES LIMITED  
12 ON THE PIPELINE APPLICATION ASSESSMENT  
13 GROUP'S 56 QUESTIONS AND CAGPL'S RESPONSES,  
14 DATED JULY 7, 1975 MARKED AS EXHIBIT 262)

15  
16 CROSS-EXAMINATION BY MR. GENEST, CONTINUED:

17 Q Thank you, sir. Peget-  
18 fully, gentlemen, but briefly I want to return to that  
19 bar chart that appears at 3D-17, that's figure 3D11 of  
20 Part 3 of the Foothills' application. I just want to  
21 make sure what conclusions we can draw from that chart  
22 and I'm not entirely clear.

23 Now, I'm correct in saying  
24 that the bar chart shows that as far as pipeline con-  
25 struction itself is concerned, one would gather that  
26 you intend to do continuous ditching in December, Jan-  
27 uary, February, March, April, am I correct? Or was it  
28 March? Yes, April.



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WITNESS MIROSH:

A Yes, that shows the ditching going through to the end of March.

Q March, but from your evidence today I take it that you do not in reality intend to do continuous ditching in December?

WITNESS KOSTEN:

A Essentially that would be correct, yes, sir.

Q So that the bar chart should not be relied upon in that respect, is that right?

A Yes, sir.

Q And the bar chart then shows a pipe stringing as an activity that will, I take it by the gap, is supposed to be intermittent in December, but that we can now take it will probably not take place at all in December?

A There could be some amount of it, I wouldn't anticipate any great extent of stringing.

Q Well what I am after, is what do you plan? You do not plan or you do plan to ditch or string in December?

A Your conclusions are correct, sir.

Q Which one?

A Your statement about the work not being performed?

Q That you do not plan to



1 do so? Then I take it that in the far north you will  
2 not do any ditching or stringing or bending or pipe  
3 laying until the end of January?

4 A It would be sometime  
5 during the last week of January that we would plan on  
6 starting those operations, sir.

7 Q And the reason for that  
8 is that in your opinion, it is unsafe to conduct those  
9 operations in the dark, is that correct?

10 A That is one of the reasons,  
11 yes sir.

12 Q Well is that not the  
13 principal reason?

14 A We have found that January  
15 can get quite, the temperatures can get quite severe,  
16 and there have been instances where operations have  
17 had to have been shut down for periods of a week to two  
18 weeks because of severe temperatures.

19 Q Well, are the temperatures  
20 not as severe down by Fort Good Hope, or Fort Norman?

21 A They can be, yes sir,  
22 they can be right down into Alberta.

23 Q And you plan there, I take  
24 it, to start on January 1st or thereabouts?

25 A Mobilization of the crews,  
26 yes sir.

27 Q I am talking about actual  
28 pipeline construction?

29 A About the middle of  
January.



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Q About the middle of  
January?

A Yes sir.

Q Not before?

A No sir.

Q And -- is it -- does the  
same hold true as we go south, say towards Fort  
Simpson?

A Yes, sir.

Q You don't plan to start  
at any of those places until well on into January?

A That is correct, sir.

Q And if you had to give  
your best estimate now, Mr. Kosten, as to when you would  
plan to start actual pipeline construction in the  
Inuvik area, what date would you give me? I won't hold  
you to it, but what would be your rough estimate?

A February 1st.

Q And what about Fort  
Norman, that area?

A About the last week in  
January, beginning of the last week in January.

Q And sir, do you plan to  
hold your operations in those areas to daylight hours  
only?

A Yes sir.

Q And --

A Let's say there could be  
some operations which would be required to be lighted  
during that period, until there is sufficient daylight,





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1 but -- such as servicing of equipment, is normally done  
2 under light.

3 Q But pipeline laying?

4 A Pipelinining, no sir.  
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1 Q So that your shifts  
2 would be confined to the daylight hours?

3 A Yes sir.

4 Q And what is the length  
5 of the day light hours, do you have any idea in Norman  
6 Wells?

7 A It's about eight hours  
8 at that point in time in the Inuvik area.

9 Q What about farther south  
10 around Norman Wells?

11 A It would extend a little  
12 beyond that to about ten hours.

13 Q So that the bulk of  
14 your construction forces would be working only those  
15 daylight hours?

16 A Yes sir.  
17 This is the intent sir.

18 Q And has that been taken  
19 into account in your estimate?

20 A Yes sir.

21 Q Have you obtained any  
22 bids of any kind in respect to that kind of schedule  
23 or that kind of work?

24 A No sir.

25 This concurs with the  
26 contractor's advice in this regard.

27 Q In your experience in  
28 northern Alberta, Mr. Kosten, in working in the winter,  
29 has that been the general practice to hold the work to  
30 daylight hours?



1 A Insofar as the operations  
2 over a spread generally are concerned yes.

3 Q Now moving then just  
4 briefly to try and recapitulate what I understand the  
5 position as to your borrow requirements, as I take it  
6 from your answers this afternoon, you have not done  
7 enough detailed field work as yet to know precisely  
8 where you will be blasting. You made an overall judge-  
9 ment that probably half the route is going to require  
10 some form of blasting but you haven't pinpointed the  
11 area?

12 A No sir.

13 Q And in that spread that  
14 I showed you for instance, 1D, you can't take that  
15 spread and tell me we'll be having so much blasting  
16 there?

17 A No sir.

18 Q You made an overall  
19 judgment?

20 A Yes sir. Say, we've  
21 allowed costs for that portion. We have not been able  
22 to be specific about specific areas of blasting.

23 Q If you can't be  
24 specific then I take it your allocation of costs has  
25 been somewhat arbitrary.

26 A I don't think that  
27 statement is really correct We have included these  
28 costs in the total cost figures for this amount.

29 Q I know the total  
30 cost figure, but what about your quantities. When I took





1 you down spread 1D, and we went down the figures on  
2 the right hand side, you have precise figures there,  
3 of 49 cubic yards per pipe trench and 49,000 cubic yards  
4 for pipe trench and pipe grading, can I take it from your  
5 answer that that is a pretty round number?

6 A I was not involved in  
7 the estimating of those figures?

8 Q Mr. Mirosh, can you help  
9 me?

10 WITNESS MIROSH:

11 A Yes. that allows for  
12 bedding the pipe in the trench.

13 Q And it doesn't allow for  
14 whatever padding you might have to do on account of  
15 blasting?

16 A It may. I'm afraid I  
17 can't recall whether that 49,000 cubic yards allows for  
18 padding as well as bedding.

19 Q Well you can't tell us  
20 tonight then. Is that right?

21 A But that number has been  
22 built up on a basis which I could get to later.

23 Q Now yesterday you told  
24 us the -- I think yesterday in another panel you made  
25 some estimates about buoyancy control and I -- correct  
26 me if I'm wrong, I believe the gist of your evidence  
27 was that your judgment was that one half the line <sup>would</sup> need  
28 some form of buoyancy control?

29 A I believe that that was  
30 in Mr. Bauer's testimony, but I recall that. I think



1 you're correct there.

2 Q Dr Bauer, have I mis-  
3 stated that?

4 WITNESS BAUER.

5 A That's right.

6 Q And of that half that  
7 needs buoyancy control, your judgement is approximately  
8 half of that will be weighted, you'll need concrete  
9 weights?

10 A That is correct.

11 Q And the other half I  
12 take it will be looked after by select backfill, some  
13 of which may be borrow ?

14 A That's right.

15 Q And until you know  
16 exactly where you're going to weight and where you're  
17 going to backfill, you really don't know where you're  
18 going to get your quantities from?

19 A That's why we prepared  
20 an estimate.

21 Q And can you tell me, Mr.  
22 Mirosh, in construction spread 1D, you have given any  
23 account to either aggregate or backfill for buoyancy  
24 control?

25 WITNESS MIROSH:

26 A Yes, there is an item  
27 under river and swamp weights which is 26.000 cubic  
28 yards, yes.

29 Q That's for concrete  
30 aggregate?



1 A Yes sir.

2 Q Is there any allowance  
3 there for backfill buoyancy?

4 A AGain, there might be in  
5 the 49,000 cubic yards which I --

6 Q But you can't tell?

7 A -- which I'm afraid right  
8 now I don't know what goes into that number.

9 Q But sir, do you know  
10 precisely where in that spread sheet you are going to  
11 backfill and where you're going to put weights on?

12 A Well I'm not sure of how  
13 those quantities were arrived at sitting here at this table  
14 but there was a rationale behind it, and we can give  
15 you that when we put it together.

16 Q My question sir is more  
17 immediate than that. I thought I heard you say this  
18 afternoon that until you made more detailed ground study  
19 than you have now, you really can't tell us where you're  
20 going to blast, where you're going to put on concrete  
21 weights, and where you're going to backfill for buoyancy  
22 control, now is that not correct?

23 A Well these will certainly  
24 be confirmed by detailed geotechnical studies but there  
25 was a basis for preparing these estimates which at this  
26 time we just can't tell you, but if we can offer this  
27 to you, --

28 Q Well they're available  
29 then you say?

30



1 A Well everything that we  
2 put together has a piece of paper that calculates  
3 numbers which resulted in the ones on this table.

4 Q Well could you make these  
5 available to Mr. Hollingworth so he can let us have  
6 them?

7 A I'm sure we can.

8 Q Similarly sir, with res-  
9 pect to side slopes, I think we heard this afternoon  
10 that a number of them may require you to use borrow  
11 material from borrow sites --

12 A Yes.

13 Q -- in order to avoid too  
14 big a cut into sensitive permafrost, for instance?

15 A Well I think the statement  
16 said may be required, yes.

17 Q And you don't know whether  
18 they will be 'til you're on the site, or 'til you're  
19 farther along in your site studies?

20 A Yes. Well yes, that's  
21 a function of how much reclamation we have to do, in  
22 other words, how much stabilization and how much soil  
23 erosion control measures we would have to take.

24 Q And you don't know those  
25 yet, do you?

26 A We won't know these until  
27 we have completed geotechnical studies.

28 Q That's the question I  
29 asked you in the first place. You don't know when or  
30 where you will need to get that backfill or where you





1 you will put it, or how much you will need?

2 A Yes. On the other hand,  
3 we may not need any in many places if the geotechnical  
4 information is such that we can perform a cut and  
5 stabilize it properly.

6 Q Mr. Mirosh, that is not  
7 what I asked you. Do you find difficulty with my  
8 questions?

9 A No sir, not at all.

10 Q I am putting it to you  
11 that you don't know now until you have completed these  
12 studies, how much or where you will need borrow material  
13 for side slopes. Now is that true or not?

14 A Yes, we will have to com-  
15 plete geotechnical studies.

16 Q Right. Now each of your  
17 spread sheets contains precise quantities, does it not,  
18 as to -- within a thousand cubic yards, as to borrow  
19 requirements?

20 A Yes, they do.

21 Q Is it not fair to say,  
22 sir, that until you get all this information, we can  
23 only regard these as very preliminary and not precise?

24 A Certainly, when we get  
25 into the detailed design phase they will be firmed up  
26 and adjusted, but they are preliminary estimates based  
27 on preliminary engineering assessments.

28 MR. GENEST: I have no further  
29 questions, Mr. Commissioner.

30 Thank you gentlemen.



1 THE COMMISSIONER: Mr. Bayly?

2  
3 CROSS-EXAMINATION, BY MR. BAYLY:

4  
5 Q Gentlemen, if I can refer  
6 you first to page 3 of your prepared evidence, I am  
7 addressing this question to Mr. Mirosh. In that evidence,  
8 Mr. Mirosh, you went into some observations on the  
9 relative fuel consumptions of the two projects, arguing  
10 in your evidence that because you were using lighter  
11 material and therefore less material, that you would use  
12 less fuel. You don't in this section go into estimates  
13 of actual fuel consumed. Have you done such estimates  
14 of the gallons of gasoline, drums of diesel fuel, the  
15 quantities of propane, et cetera, that this project  
16 will consume?

17 A Yes. These numbers were  
18 shown in the application, but I do have some numbers.  
19 Did you want me to --

20 Q Could you just go over  
21 those, if you have them in front of you?

22 A Yes, this is for the  
23 total project. The right-of-way construction fuel  
24 requirement we have estimated at 138,000 tons of fuel.  
25 The support activities to the right-of-way work which  
26 would be basically the work going on on the access  
27 roads and in the wharf sites and staging areas, would  
28 require 40,000 tons of fuel. These two figures are  
29 mostly diesel and a little gas.

30 The total propane requirement



1 we have estimated at about 46,000 tons, which includes  
2 propane which would be used on the right-of-way and at  
3 camps, and that number includes the processed propane  
4 as well.

5 And for aviation fuel, we have  
6 estimated 32,000 tons. Those -- that's the spectrum of  
7 the total fuel requirement for the project. We have  
8 also added a contingency of approximately 10 percent,  
9 which makes our total 284,000 tons.

10 Q Mr. Mirosh, does this  
11 include say the energy consumed in producing the steel  
12 and rolling the steel into pipe, or is that not  
13 included in this computation?

14 A No sir, this is strictly  
15 the work that would be going on north of the 60th  
16 parallel.

17 Q And then I take it it  
18 doesn't -- does it break this down into say gas  
19 equivalents, natural gas equivalents?

20 A Well we haven't done this  
21 but one could put it all on a BTU basis.

22 Q I gather this hasn't  
23 been done. What I'm suggesting to you, sir, is that  
24 it could be possible to look at this project in terms  
25 of the amount of energy to produce it, and whether there's  
26 enough energy in the Mackenzie Delta which is where you  
27 intend to take the gas, to make it worthwhile? In  
28 other words, have you looked at it from the point of  
29 view of whether you are taking out as much energy as  
30 you are putting into this project?





1                   A     Well, as a matter of fact,  
2     this was an interesting question which somebody raised,  
3     I guess several months ago and we did a very quick  
4     calculation. I don't even recall everything that went  
5     into it, but the energy coming out very quickly well  
6     within the first few months of the project, or within  
7     the first year, I forget which, is equalled. And that  
8     number, I think, took into account some estimate for  
9     steel making and so on.

10                  Q     Right. Did that go into  
11     the energy that is required to make the machinery that  
12     has to build the project as well, or was it as extensive  
13     as that?

14                  A     Well it wasn't a refined  
15     calculation that went right back to all of the energy  
16     requirements to build the nuts and bolts and so on, no.

17                  Q     Did it take into account  
18     the fact that a pipeline consumes, at least according to  
19     Arctic Gas' figures, approximately 7 percent of its  
20     energy in transporting through the facility?

21                  A     Well in the sense that we  
22     were looking at equating how much energy we thought  
23     was required to put the project off the ground and  
24     equating that to the ultimate energy out the end of the  
25     pipeline. It did take that into account, yes.

26                  Q     Now, on page 9 of your  
27     evidence, and I'm not sure whose question this should  
28     be, perhaps Mr. Kosten's, your pages aren't numbered,  
29     so I will try and find a question number for you.  
30     Question 11, third page, of the procedure -- have you



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1 got the page there?

2 WITNESS BAUER:

3 A Yes.

4 Q The procedure which is  
5 outlined on that page basically is to weld sections of  
6 pipe, then to ditch, so that the ditch won't be open  
7 for too long a time and then to put the pipe into the  
8 ditch, is that --

9 THE COMMISSIONER: Those are  
10 questions for Mr. Bauer.

11 MR. BAYLY: I think they were  
12 addressed to Mr. Bauer. The reason I have suggested  
13 perhaps Mr. Kosten might answer them is when Mr. Genest  
14 was cross-examining him, he seemed to field this kind  
15 of question, but --

16 THE COMMISSIONER: All right,  
17 go ahead. I just --

18 MR. BAYLY: I'm quite happy if  
19 it's more comfortable for Mr. Bauer to field this  
20 question, but let me ask it first and then you gentlemen  
21 decide who is to answer it.

22 Q Have I stated fairly the  
23 procedure of -- sorry, the steps that are taken in the  
24 procedure to put the pipe into the ditch?



1 WITNESS MIROSH: Yes.

2 WITNESS KOSTEN:

3 A That is what

4 is normally done of a conventional winter project is  
5 the amount of open ditches constrain to prevent excess,  
6 if you want material becoming frozen and then having  
7 to put that back in the ditch. I should point out that  
8 the -- in a summer operation. the ditch would precede the  
9 bending. Now where you are in an area where your spoil  
10 material, is totally frozen, this procedure might be  
11 reversed back to the conventional summer operation  
12 where your ditch might precede the bending. It will  
13 depend on the type of material you're in. If you're in  
14 muskeg, you pretty well have to go to the winter operation  
15 to make it workable.

16 Q Now, how long are the  
17 sections that you weld together prior to digging the  
18 ditch?

19 A This will depend on the  
20 type of terrain. Something of the order of a thousand  
21 feet.

22 Q And when you're given a  
23 right of way of the width that is contemplated, what do  
24 you do with this pipe while you're digging the ditch?

25 A It is welded up and you  
26 ditch along side of it.

27 Q Now, I'm trying to form  
28 a picture in my mind of this. As the pipe gets stored,  
29 where the ditcher if you're using one will be placing the  
30 spoil mound or on the opposite side?



1 A No, on the opposite side.  
2 What is called the working side.

3 Q So it has to go on the  
4 -- it's got to go on the side --

5 A The side of the mound.

6 Q Yes, but on the opposite  
7 side of the working pad as well, is that correct?  
8 It gets swung right over the working pad?

9 A Yes.

10 It will be ten to 15 feet  
11 off of each centre line.

12 Q And you've referred to  
13 being concerned with frozen material in your spoil as  
14 it is removed either by ditching or blasting.

15 A Yes sir.

16 Q The question I'm about to  
17 ask was deferred slightly to this panel. That is when  
18 you are blasting, I assume that you have a large amount  
19 of fairly rough spoil material which has to be placed  
20 back in the ditch and one of the concerns in the Alaska  
21 project was whether or not that matter was to be pulverized  
22 before being placed back in the ditch. Do you have any  
23 plans or have you done any studies on this?

24 A No sir. We did discuss  
25 this with a blasting specialist as to the characteristics  
26 of the material that could be expected to result from the  
27 blast, and the blasting procedure that we are looking  
28 at, we feel would sufficiently pulverize the material  
29 that in most instances could be dug with a wheel trencher,  
30 thus minimizing the amount of large masses of material.





1 Q Perhaps you could describe  
2 the size of material you would anticipate ending up with  
3 on the top of your berm or spoil mound after it's  
4 been replaced on top of the pipe?

5 A You could have large  
6 masses of material resulting from the active layer  
7 separating and these could be separated and then  
8 replaced on the ditch line.

9 Q All right. now I'm not  
10 sure that my question was understood. I'm thinking  
11 of the size of the bits of material rather than the  
12 actual quantities. Do you end up with things the size  
13 of a fist or the size of a marble or eight inches across.

14 A The advice that we have  
15 indicates about -- possibly a mixture of one to three  
16 inches.

17 Q And have you done studies  
18 or have you taken opinions as to whether this is  
19 sufficiently fine to properly revegetate and reclaim the  
20 berm or spoil mound?

21 A I think I would defer  
22 this question to -- this deals with the revegetation  
23 part of it.

24 WITNESS MIROSH.

25 A Yes I'd have to pass  
26 the ball there to the environmental people who are  
27 concerned with revegetation and the characteristics.

28 Q Would you be able to  
29 tell me who it would be that I would address this to  
30 in future panels?



1 A Yes, Mr. Bouckhout who has  
2 appeared on the location panel will be appearing on a  
3 panel which I believe will deal with revegetation.

4 Q Now we've gone into  
5 some discussion or you have, with Mr. Genest, concerning  
6 when you will work and when you won't work, and one of  
7 the things that seems to determine that is the weather.  
8 But one of the things that I didn't get from that  
9 examination was at what temperature would you contemplate  
10 having to shut down?

11 WITNESS KOSTEN:

12 A About 35 degrees minus  
13 Fahrenheit, this depends on whether there is a wind along  
14 with the temperature.

15 Q Now when you say that,  
16 are you looking for 35 degrees below wind chill factor  
17 or 35 degrees below with a wind making it functionally  
18 lower than that?

19 A Generally it is very  
20 difficult to work at anything below that temperature.

21 Q Have you done surveys  
22 in the Mackenzie Valley to find out how many interrup-  
23 tions you can forecast during the months in which you  
24 intend to work, having days of this kind?

25 A We examined the weather  
26 records. I couldn't give you specific days on which  
27 -- the number of days. We have made allowances in our  
28 estimates for non productive days.

29 Q What percentage would  
30 you have allowed for non productive days during the days



1 in which you intend to work?

2 A I believe it's about  
3 20 percent. Something of that order, 20 to 25 I believe  
4 the figure is.

5 Q Could we then using  
6 Mr. Jarvis' snowroad prognostications, have a look at  
7 these. Have you got those before you sir?

8  
9 I don't have the  
10 exhibit numbers. perhaps Mr. Hollingworth has written  
11 them on his. They're the yellow sheets in any event,  
12 with the three spread camps on them or the three  
13 series of spreads camps.

14 Miss Hutchinson informs me  
15 that they're all exhibit 258 for the record.

16 Now looking at these sir,  
17 and taking what you said to Mr. Genest that you won't  
18 be working in spreads one and two until the beginning  
19 of February, is that correct?

20 A That is correct.

21 Q And if we take the green  
22 line as the most conservative estimate, of the number of  
23 days in which your snow road will hold up. I'm reading the  
24 chart right I take it? That is the least number of days  
25 in which the snow road could hold up?

26 A Yes sir.

27 Q You would have approximately  
28 90 days during which you would contemplate working less  
29 20 percent as your estimate for bad days?

30 A That is correct sir.





1 Q Now I didn't take into  
2 account the 20 percent estimate. but I did calculate  
3 that even if you had all good days during that green  
4 line period, you would have to make approximately .61  
5 miles per day, given that you anticipate each spread  
6 doing 55 miles, if you were working on the green line  
7 as your most conservative estimate?

8 A In that area, our  
9 estimate was based on forward production of 3,000 feet  
10 per calendar day.  
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1 Q All right, on 3,000 feet  
2 per calendar day, that would be not very far off, 60  
3 percent of a mile per day? Now that doesn't take into  
4 account, though, working on the green line basis, you  
5 must have taken your figures as working perhaps somewhere  
6 in between the green and the yellow? You have taken one  
7 of the probables rather than the possibles on the out-  
8 side of the snow road calculation?

9 A Well let's say that we  
10 estimated the number of days that we would need on that  
11 production, on a calendar day production.

12 Q All right, now I take it  
13 you have also looked at Arctic Gas' estimates of the  
14 progress they would contemplate making per day?

15 A I really, this is what I  
16 have heard here.

17 Q Let me --

18 A I am not prepared to try  
19 and compare them, sir.

20 Q Well let me tell you what  
21 it was and where it's found, and I'm referring to the  
22 evidence of Mr. Dau in the equivalent panel of Arctic  
23 Gas evidence at Volume 37 of the transcript at page  
24 4764, where he refers to a rate of .64 miles per day.

25 A Right.

26 Q So you are contemplating  
27 an approximate rate of speed that is per spread per  
28 year, -- sorry, <sup>p</sup>per day, the same, even though you don't  
29 contemplate working the same number of days as Arctic  
30 Gas forecast, is that fair to say?



1 A That could be, I --

2 Q All right, perhaps Mr.

3 Mirosh is more familiar with this and has made that kind  
4 of comparison.

5 WITNESS MIROSH:

6 A I think the numbers that  
7 you're citing are ones we have looked at some time ago.

8 Q All right, what does that  
9 mean, that you don't remember them?

10 A I can't remember if the  
11 number you are saying is right, but I take it as being  
12 what they have said, yes.

13 Q All right. Now if we take  
14 the fact that your spreads will do less work in a  
15 calendar year, it's because basically you don't contem-  
16 plate working during certain months that Arctic Gas  
17 says they can work in, and those are the dark cold  
18 months?

19 WITNESS KOSTEN:

20 A I can't say I know what  
21 their starting <sup>d</sup>date is on their spreads.

22 Q All right. And if we can  
23 just follow this through, just so that I make sure I  
24 have got it right on the spreads 3, 4 and 5, those are  
25 somewhere in the middle, on either side of Norman Wells  
26 and Arctic Red River. Those are the spreads in which  
27 you would think you would start somewhere near the end  
28 of January?

29 A Yes sir.

30 Q And if we take the most



1 conservative there, you would have to stop as early as  
2 the middle of April?

3 A According to the chart  
4 here, yes, if that was used as the basis, it wasn't.

5 Q And at the moment that's  
6 the best basis you've got, you're relying on Mr. Jarvis'  
7 prognostication?

8 A That is correct.

9 Q Although, to be fair to  
10 you, you could have as long as until the middle of May,  
11 if you had a good, long winter?

12 A It would depend on the  
13 weather conditions at the time, sir, yes.

14 Q And the same in spreads  
15 6, 7 and 8, I take it you still wouldn't start the  
16 stringing operation until the last week of January or so,  
17 and would be able to go approximately the same length  
18 of time?

19 A That is essentially  
20 correct, yes sir.

21 Q Now given that that is so,  
22 I am interested that we had evidence prior to that of  
23 a rather massive evacuation around Christmas time. You  
24 contemplated taking out a large number of men. Well,  
25 why do you take them out if they haven't got there yet?

26 A We are not taking them  
27 out, sir, we are not starting until after Christmas.

28 Q All right. Not why were  
29 you referring to removing the men for Christmas? I  
think Mr. Mirosh was referring to this, this was a little





1 puzzling.

2  
3 A This was in relation to the  
4 assumed question that Mr. Genest put to me that if we  
5 assumed that we could work prior to Christmas, this  
6 condition would result during the last part, latter  
7 part of December.

8 Q All right, so if you were  
9 working at Christmas which you aren't, you wouldn't be  
10 working at Christmas because the men would get it off?

11 A This is my opinion, yes.

12 We have seen enough evidence  
13 of this on actual projects that it becomes a matter of  
14 practicality that it's better to shut down the project,  
15 rather than attempt to --

16 Q All right. I take it you  
17 could work in early December, though, given that the  
18 light conditions then might be quite similar to the  
19 light conditions, say at the end of January?

20 A I believe December is  
21 pretty well total darkness, for all intents and purposes.

22 Q Oh, excuse me. Which  
23 member of the panel should I question about degree days?

24 A Mr. Jarvis.

25 Q Because my understanding  
26 of the way the earth generally cools off, the temperature  
27 lags somewhat behind the progress of the sun, in that  
28 the earth may be warmer -- the temperatures may be  
29 warmer, for example in Inuvik in December than they are  
30 in January, despite the fact that the shortest day may  
31 be the 21st or the 22nd of December?



1 THE COMMISSIONER: That might  
2 well be so.

3 MR. BAYLY: I'm just asking if  
4 that is a phenomenon that I'm correct on, because I  
5 wanted to go from there into some questions, sir. If  
6 we don't agree on that, I will abandon the line of  
7 questioning.

8 WITNESS KOSTEN:

9 A Are you asking me, sir?

10 Q I'm asking the panel in  
11 general.

12 THE COMMISSIONER: Well I  
13 thought your objection was to darkness rather more than  
14 temperature?

15 A That's correct, sir.

16 THE COMMISSIONER: Now we  
17 have established that. Shall we take a vote as to  
18 whether you agree with this <sup>theis</sup> or not----

19 A I suppose there is a  
20 possibility of a temperature on a particular day being  
21 in an acceptable working condition, I don't deny that.  
22 I think the likelihood of any prolonged warm spells  
23 such as this, I don't think it's very likely. One day  
24 isn't much good to you.

25 MR. BAYLY:

26 Q Right, but to get back to  
27 your evidence, we have from Mr. Jarvis a sheet saying  
28 that the winter road would be prepared in the spreads  
29 1 and 2 area, for example, fairly early in October --  
or sorry, November. Now wait a minute, "near the end



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1 of November" at his best guess.

2 A I would refer that question  
3 to Mr. Jarvis.

4 Q Mr. Jarvis, under the best  
5 conditions?

6 WITNESS JARVIS:

7 A Under the most favourable  
8 conditions, about the end of November, yes.

9 Q Varying perhaps two or  
10 three weeks to the worst conditions when it wouldn't be  
11 ready until the middle of December?

12 A That's what it says on the  
13 chart, yes.

14 Q All right, and so what  
15 you are saying is even though you have a surface that  
16 would be ready to work on for as long as two months,  
17 and taking the most conservative for as long as six  
18 weeks, because of the darkness and the temperature as  
19 you have the figures, you don't think it's worth going  
20 in there at all before that period?

21 WITNESS KOSTEN:

22 A I'm sorry, I missed it,  
23 you came up with two months.

24 Q Oh, I took December and  
25 January.

26 A Oh, I see.

27 Q As being months when your  
28 snow road would be ready, but when you feel because of  
29 darkness and cold, you wouldn't want to go in.

30 A That is correct, sir.





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1 Q Right, and has Foothills  
2 done studies on how much light there is in Inuvik and  
3 Norman Wells during late November and early December,  
4 to see whether it would in fact be possible to work  
5 there at that time?

6 A I looked at the daylight  
7 charts. I can't say that I have had any extensive done  
8 studies on it. I don't know whether Foothills have gone  
9 into this to any extent.

10 Q All right. Has any member  
11 of the panel been in the Mackenzie Valley during this  
12 time of year, to have a look at it, in terms of looking  
13 to see how light and dark it is and whether you could  
14 actually do work?

15 WITNESS MIROSH:

16 A Well in and out for short  
17 periods of time, but not with the thought in mind of  
18 checking how much daylight there was.

19 Q All right. Now when you  
20 are talking about daylight, have you been talking about  
21 hours of time when the sun is above the horizon, or are  
22 you talking about times when it is light without neces-  
23 sarily having sun?

24 WITNESS KOSTEN:

25 A We are talking of  
26 daylight.

27 Q Alright, you are talking  
28 daylight?

29 A Yes, sir.

30 Q What do you mean by



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1 daylight? We may be talking about different things.

2 A When it is not dark.

3 Q So you don't rely simply  
4 on the sun in these --

5 A No sir.

6 Q And the charts that you  
7 have refer to the hours when you can see?

8 A Hours of daylight, yes.

9 Q All right. How do they  
10 determine that? Do they determine whether you can see  
11 well enough to read, or see well enough to walk, or  
12 how do these --

13 A I couldn't answer that,  
14 sir.

15 MR. HOLLINGWORTH: Who do you  
16 mean by "they"?

17 MR. BAYLY: Well I'm assuming  
18 "they", Mr. Commissioner, are the people who made up  
19 the charts. I just wondered how they defined daylight,  
20 whether they had some way of --

21 A I did not go into that,  
22 sir.

23 Q All right. I take it if  
24 you did in fact change your decision and decide to work  
25 before Christmas, you might have quite a bottleneck  
26 getting people out for that two week period, given that  
27 they would all be removed, or a lot of them would be  
28 removed by helicopter?

29 WITNESS MIROSH:

A Well I wonder if I could



1 make one point? If we assume that the minimum possible  
2 road availability is the middle of December, then it  
3 would almost be pointless to begin on December 15th and  
4 begin pulling out at the same time for the Christmas  
5 period, which is one of the thoughts that went into  
6 starting after the New Year.

7 Q All right, that was one  
8 of the things I was hoping you would say, Mr. Mirosh,  
9 because it seemed to make sense.

10 A Yes.

11 Q Not to start work and then  
12 pull out a few days later with your entire --

13 A Yes.

14 Q -- and that was something  
15 that was thought of, was it?

16 A Yes.

17 WITNESS KOSTEN:

18 A Let me make this comment,  
19 that I don't think it would be economically practical to  
20 fire up, say, sometime in the first part of December  
21 for say 10 days' work. You can't gear up a spread --  
22 everything doesn't start on day one. It takes a period  
23 of time to get the operations in motion, and likewise  
24 for when you have to bring them back, you have to then  
25 go through the same process.

26 Q All right. Now I quite  
27 agree with you, sir. I thought just that that must be  
28 almost as important as the hours of light and hours of  
29 cold weather. A this certainly was one of the considerat  
30 -ions of it



1 Q Now, Mr. Mirosh, you told  
2 us about the numbers of men you would contemplate having  
3 in the camps, and if I can suggest to you that you might  
4 run into a problem of being behind, because of bad  
5 weather conditions or strikes or whatever sorts of things  
6 could come up to stop the project. Now, would you a  
7 anticipate making camps in such a way that they could  
8 accommodate a larger number of men so that you could  
9 speed up the work if required?

10 WITNESS MIROSH:

11 A Well if we had a problem  
12 during the first year of construction, we of course  
13 would be able to consider how we would make that up  
14 during the second year, and the nature of the number of  
15 camp buildings that we have to purchase, or that we  
16 propose purchasing for the first year, would be such  
17 that we will have spare capacity for this kind of a  
18 build up for the second year.

19 Q Now, given that in the  
20 first year which in a sense is an experimental year,  
21 I suppose for speed, you're taking your best guess at  
22 the speed at which the project would go, and given that  
23 you may not be able to start your spreads until after  
24 you've fired up and got going, really early February,  
25 you've got about two months and a little more until you  
26 have to stop using your snow roads at the earliest. I  
27 take it that under those conditions, a shut down for  
28 say ten or 15 days is pretty critical. Would that  
29 be fair to say?

30 A Yes, but for spreads one





1 and two we do have in excess of three months, and there  
2 is a possibility of extending the use of snow roads by  
3 running traffic, running the logistics traffic over those  
4 snow roads, after the sun has set or before it's really  
5 risen, in other words, to adjust your working as a  
6 contingency measure, there is also the possibility  
7 of patching snow roads, with the snow making equipment  
8 which we do have in our plans as a maintenance tool and  
9 for constructing ice bridges.

10 Q Now I take it you have  
11 a bit of difficulty with your first problem in that as  
12 you get close to the end of the life of the snow road,  
13 you aren't getting very many days when -- many hours when  
14 the sun isn't shining during the day? Once you get into  
15 April, say the spreads of one and two that is a problem?

16 A Well that could be a  
17 problem on a theoretical basis in the later spreads.  
18 The further south spreads.

19 Q You would be more  
20 concerned with it in spreads five to eight than in spreads  
21 say one to four, is that what you're saying?

22 A Yes, according to the  
23 charts, the availability of the snow road does tend to  
24 shrink so that would be more of a concern to us.

25 Q All right.

26 A Now, on page 16 of your  
27 prepared evidence, you refer to the spreading of com-  
28 petent personnel over the project, so that they aren't  
29 all in one region. What sorts of training do you plan  
30 to give to the personnel to make sure that they are the



1 competent people that you think they are? Have you gone  
2 into that in your studies?

3 A Well have as a company  
4 got into that and the future panel dealing with that  
5 subject will be before this inquiry. Mr. Burrell  
6 will be a member of the panel who has been involved in  
7 the Nortran program and who does have thoughts along  
8 these lines. I might add that the sort of thing  
9 would be training for equipment operators during the  
10 clearing pre-construction activities. I think that's  
11 been put forward as one of the additional reasons for  
12 carrying clearing out in advance not only to level out  
13 the manpower peak or to reduce it in the subsequent  
14 years, but to provide a period of operator training  
15 for machines.

16 Q All right, now if I  
17 refer to the procedure that Arctic Gas has used, tell  
18 me if you've studied it and considered it to be worth-  
19 while. They speak of preparing operations manuals  
20 for the distribution to the personnel so that they will  
21 know about northern conditions, techniques, the company  
22 would like to use, and procedures that they should follow.  
23 Do you contemplate doing that sort of thing?

24 A Yes, this is out of the  
25 scope of this panel I think, but will be covered on the  
26 one I've referred to. However this I know has been  
27 discussed. Some form of education to the people coming  
28 on the project, much in the same way and perhaps to a  
29 greater extent than Alyeska's carrying out to their  
30 new personnel.



1 Q Have you started to draft  
2 the kind of procedures?

3 A Well I haven't, but the  
4 personnel in Foothills concerned with that aspect have  
5 been aware of it, discussing it and I would suspect that  
6 it's being drafted.

7 Q If that is the case, Mr.  
8 Commissioner. perhaps we could have the benefit of  
9 kinds of input that has gone into this, if we actually  
10 have a draft of this kind of thing, it appears that it  
11 would be very useful to this inquiry to see what  
12 kind of on the job training or prejob training Foothills  
13 would contemplate giving to its various levels of workmen  
14 and tradesmen.

15 MR. HOLLINGWORTH:  
16 I'm advised that this  
17 document is very much in the formative stage at this  
18 time Mr. Commissioner. We can certainly produce it if  
19 as and when -- of course, that's ridiculous, of course  
20 it will be produced, I'm not sure when, that's all

21 THE COMMISSIONER: Well as and  
22 when it's completed it will be provided to all the  
23 participants. We have Mr. Hollingworth's undertaking on  
24 that.

25 MR. BAYLY: Thank you sir.

26 On page 18 gentlemen, you  
27 refer to some problems or some things you must take into  
28 consideration, with regards to skilled labour. Without  
29 going into this you go into appropriate incentives  
30 haveing to be provided. Are those all monetary or do  
you plan some special considerations for skilled people?





WITNESS KOSTEN:

1 A Essentially they're  
2 monetary.

3 Q Allright, and un-  
4 essentially? Are there others?

5 A I don't think that you  
6 can define other incentives. They basically are monetary.

7 Q All right, my understanding  
8 of, and Mr. Scott will probably correct me if I'm wrong,  
9 because I'm not a labour lawyer, but it appears that  
10 skilled tradesmen often are more interested in the fringe  
11 benefits of contracts, as they're sometimes called, than  
12 the actual monetary return that they're going to get.  
13 Is that what you mean by appropriate incentives other  
14 than money.

15 A What do you mean by  
16 fringe benefits?

17 Q I was going to ask  
18 you the same question sir.

19 The reason I'm concerned sir  
20 is that I'd like to know whether you contemplate giving  
21 them special housing, special rest and relaxation,  
22 privileges, special trips out to visit their families that  
23 might not be given to other workers, or that's what  
24 I want to know about appropriate incentives?

25 A If that sort of thing be-  
26 came -- it's possible that this might be evolved if you  
27 want, out of negotiations, then you would have to make  
28 the same concessions to all the workers, not just to some  
29 of them, and we hadn't contemplated that sort of thing  
30 though.



1 Q Skilled labour though  
2 is your problem if there is one in labour though, I take  
3 it rather than unskilled labour?

4 A Well --

5 Q You have to do something to  
6 lure the pipeline welder from Texas in the middle of  
7 January?

8 A You'll pay his way.

9 Q Somebody who is in demand  
10 is hard to get.

11 A I wouldn't anticipate  
12 we would need any skilled welders from Texas.

13 THE COMMISSIONER:

14 Q Just before we leave this,  
15 Mr. Kosten, I was impressed by this part of your prepared  
16 evidence, in that you were putting it quite frankly that  
17 you would have to pay these people incentives to get  
18 them to come up, you made it clear that you needed these  
19 skills, you would have to pay for them, and the  
20 implication seemed to be that they would be people from  
21 the south and that the opportunities for northerners  
22 would be on jobs that are essentially unskilled,  
23 or certainly lesser skilled.

24 Let me just interrupt you  
25 for a moment Mr. Bayly if I may, because --

26 MR. BAYLY: Fine, Mr.  
27 Commissioner, it's my next question. You can probably  
28 put it better than I can.

29 THE COMMISSIONER: Well you  
30 said here on page 18, you say at the top, "The  
31 availability of skilled labour for any project is a function



1 to a degree of the market, and of the incentives provided  
2 to attract labour. In order to attract craftsmen to  
3 a project in a remote area and work under conditions that  
4 are anticipated, the appropriate incentives must be  
5 provided and these have been duly considered in developing  
6 the Foothills project." You say it is submitted, the  
7 = nucleus of the crews of tradesmen that will be required  
8 are presently available and we refer again to the example  
9 of the Sarnia Montreal Pipeline and so on. The craftsmen  
10 involved in pipeline construction are welders, machine  
11 operators. Teamsters and skilled and unskilled labourers."  
12 Now, let's take the front end welders. Putting automatic  
13 welding to one side.

14 A All right.

15 Q Last fall I think it was  
16 I visited the site where the Trans Canada Pipeline  
17 Company was looping its main trunk line near Kingston.  
18 The front end welders there, were performing what seemed  
19 to be a very highly skilled kind of work and a skill  
20 that obviously must take some years to acquire, with the  
21 speed and the efficiency with which the crews worked.  
22 They can't just take people off the street and train  
23 them to do that. Now those people they were welding  
24 near Kingston Ontario. They weren't somewhere north of  
25 Norman Wells and presumably they were getting very very  
26 high wages, no doubt deservedly so, on any system of  
27 rewards, of any sort of society.

28 To get those people up here,  
29 you'd have to pay them I take it what Front end  
30 welders must be getting on the Alyeska Pipeline, there  
isn't and doubt about that, is there?



1 A I am not trying to equate  
2 this to the Alyeska job, however sir there are presently  
3 union agreements that have been negotiated between the  
4 -- and I'm talking about all four trades that have been  
5 negotiated between the unions and the Pipeline Contract-  
6 ors' Association acting as agent for the contractors.  
7 The hourly rates, and these incentives are now estab-  
8 lished in these contracts.

9 Now, this is not to say that  
10 they won't be changed.

11 THE COMMISSIONER: Yes, but  
12 when you come up here as opposed to looping outside of  
13 Kingston, I mean when you have got these men working  
14 up here, and I don't mean Yellowknife, I mean let's say  
15 north of Norman Wells --

16 A Right.

17 THE COMMISSIONER: -- instead  
18 of outside Kingston, they are working longer hours,  
19 they are working seven days, they are working perhaps  
20 12 hours a day --

21 A Yes, sir.

22 Q -- they are working 10  
23 -- well I have forgotten what you told us your schedule  
24 was going to be, but even given the present union rates,  
25 they would be making about as much as front end loaders  
26 are making in Alaska, wouldn't they?

27 I mean, if you don't agree,  
28 don't hesitate to say so, I am just trying to find some  
29 kind of point of departure here.

30 A There might be, if I





1 understand what you are trying to get at, there might  
2 be some impact on the wages being paid on the Alyeska  
3 project. That is very difficult to determine at this  
4 point.

5 Q Well if you wanted to  
6 build a pipeline here, the welders' union, whatever it  
7 is, they would probably start off by saying they wanted  
8 the same rate as front end welders are getting on  
9 Alaska, wouldn't they?

10 A I don't believe that  
11 necessarily follows, sir. There are different wage  
12 rates. For instance, in the southern states compared  
13 to Alaska. It depends on whether one wants to work in  
14 that environment.

15 THE COMMISSIONER: Yes. Well

16 --

17 A What I am saying is --

18 THE COMMISSIONER: The environ-  
19 ment on this pipeline would resemble the environment on  
20 the Alaska pipeline more than it would the southern  
21 U.S.

22 A Yes, sir.

23 THE COMMISSIONER: Now --

24 A There have been welders  
25 here that have worked on winter projects, sir, is what  
26 I am getting at.

27 THE COMMISSIONER: In the  
28 Northwest Territories?

29 A Not very much in the  
30 Northwest Territories, but in northern Alberta and



1 British Columbia where your conditions approach what we  
2 feel are going to be the conditions here.

3 THE COMMISSIONER: Well now,  
4 are there any northerners that you know of, qualified  
5 to be employed as front end welders on a project like  
6 this?

7 A There could possibly be,  
8 I don't have -- I'm not personally aware of it, sir.

9 THE COMMISSIONER: All right,  
10 but you are really thinking of the people that have been  
11 assembled to build the Sarnia-Montreal pipeline? You  
12 are thinking really of that nucleus coming up here,  
13 isn't that the size of it?

14 A There would be some of  
15 them, yes sir, a considerable amount of them, I believe.

16 THE COMMISSIONER: All right.  
17 Then --

18 A We are talking about the  
19 key experienced people.

20 THE COMMISSIONER: Yes. Then  
21 you say 18, last paragraph, "Due to the relative  
22 decrease in pipeline construction activity in the last  
23 year or two, prospective trainees experienced little  
24 opportunity to utilize their training due to lack of  
25 work opportunities, so interest in the training programs  
26 decreased to the extent that the last two welding  
27 training programs, one in 1974 and one in the spring  
28 of 1975 had to be cancelled".

29 Now, does that mean that the  
30 long-term employment prospects in pipeline construction



1 have been so dismal, that you had to cancel the proposed  
2 training programs scheduled for 1974 and the spring of  
3 '75?

4 A I'm advised that the  
5 attitude of the prospective trainees was that because  
6 of the lack of pipeline activity, their probability of  
7 being able to get on a job following their training  
8 wasn't there to the extent that they felt that there  
9 was not much point in going through a training program  
10 and not being able to get a job after.

11 THE COMMISSIONER: Yes. Then  
12 on the --

13 A This is third hand  
14 information, sir. It comes from the Pipeline Contract-  
15 ors' Association.

16 THE COMMISSIONER: Well, the  
17 -- some other passage here, maybe I have missed it.  
18 Somewhere here you said something that sounded -- oh  
19 yes, top of page 20. You say, and this is the passage  
20 where I thought you were being very frank about the  
21 whole thing.

22 You said, "Inasmuch as the  
23 northern natives have had little exposure to pipeline  
24 construction in the past, they will to a large extent  
25 be limited to the type of work they can perform.  
26 Operations such as clearing" -- that means cutting  
27 brush, I take it?

28 A Yes, sir.

29 THE COMMISSIONER: "...and  
30 grading", and that would involve some earth moving





1 equipment, would it?

2 A Right, yes, sir.

3 THE COMMISSIONER: "...can  
4 utilize a larger quantity of unskilled labour". Now,  
5 you're really saying there that the northern natives,  
6 having had little exposure to pipeline construction in  
7 the past, will to a large extent be involved in unskilled  
8 labour. That's essentially the picture, is it?

9 A I'm not -- I'm leaving an  
10 incorrect impression there. If the people can qualify  
11 themselves through training programs, to become familiar  
12 with the equipment, then this certainly would qualify  
13 them to be used in other activities.

14 THE COMMISSIONER: Yes, but you  
15 are really saying that that sort of program and its  
16 success to one side, northern natives will essentially  
17 be involved in clearing and grading, and not in pipeline  
18 construction?

19 A This was not the impress-  
20 ion that I intended to leave, sir.

21 THE COMMISSIONER: All right.  
22 Then you go on.

23 A I --

24 THE COMMISSIONER: What we  
25 are concerned with here is really finding out what is  
26 likely to happen if this pipeline is built, not, you  
27 know, a lot of rosy forecasts that we don't have any  
28 confidence in, but that sound nice and so forth.  
29 That's what I'm --

30 A Perhaps I can clarify



1 that by an example where you could put an operator on a  
2 dozer moving dirt, for instance, where the likelihood  
3 -- or say compared to an operator on a side boom which  
4 is carrying a length of pipe. I say a length, I don't  
5 mean a single joint, I mean a welded up length where  
6 there are several side booms on this, and there are  
7 people on the ground involved in working with the pipe,  
8 but the operator on the side boom has to have had con-  
9 siderable number of years experience to preclude him  
10 from making a wrong move that would endanger the lives  
11 of, you know, several --

12 THE COMMISSIONER: Of course.

13 A -- people. This sort of  
14 operation you need people with hard experience.

15 THE COMMISSIONER: Precisely,  
16 and I'm not being critical in any way. We are just  
17 trying to see what kind of a situation this is going to  
18 be.

19 People sitting around this  
20 room, all of them, Dr. so and so, and Mr. so and so,  
21 you wouldn't put them on that kind of a job.

22 A That is correct.

23 THE COMMISSIONER: And to say  
24 to us that you wouldn't take people living in the North-  
25 west Territories here, and put them on that sort of a  
26 job, that seems to me is perfectly logical.

27 A Essentially, Mr. Commiss-  
28 ioner, in my opinion at least around the safety aspects  
29 of handling equipment, and there are less critical --  
30 there are varying degrees of where skill is critical,



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1 and in those areas, you need people with hard construct-  
2 ion experience with that type of equipment.

3 There is other equipment that  
4 can be operated, for instance, that is not in that  
5 degree of criticalness.

6 THE COMMISSIONER: Well you  
7 could take the people in this room and those that were  
8 physically fit could probably work on clearing and slash-  
9 ing and burning and all of that kind of thing. Grading,  
10 some of us you might qualify to operate heavy equipment  
11 over a period of time, I suppose, but once you get beyond  
12 that to your pipe stringing, and trenching and pipe-  
13 laying, you are into some fairly highly skilled kinds  
14 of work that there are not a great many people qualified  
15 to do.

16 A Yes, I suspect to take it  
17 out of the realm of the unskilled, maybe that's poor  
18 terminology, but I suspect there would be quite a number  
19 of truck drivers, for instance, that would be available  
20 north of the 60th parallel.

21 THE COMMISSIONER: Well then  
22 you say, "This was considered", that is you say -- you  
23 said in this paragraph at the top of page 20, you said  
24 the northern natives would probably be limited to  
25 operations such as clearing and grading which utilize a  
26 larger quantity of unskilled labour.

27 Then you say this: That is,  
28 their being used in that kind of work was "considered  
29 in Foothills' proposal to perform this activity one  
30 year ahead of pipeline construction, thus providing



1 employment opportunities over a longer period for such  
2 of the northern labour that had an interest".

3 Now once again, don't think  
4 that I am in any way critical, but you appear to have  
5 been commendably straightforward about all of this, and  
6 you said "Northern natives will be involved in clearing  
7 and grading", that will go on a year ahead of any pipe-  
8 line and you said that that would thus provide employ-  
9 ment opportunities over a longer period. What I don't  
10 quite understand is that would mean the clearing would  
11 occur within one year, and then it would be over.

12 I don't quite understand why that would be employment  
13 for northern natives over a longer period. Have I  
14 missed something?

15 A Well what I am saying is  
16 that the people that acquire training during that phase  
17 of the operation, could then be absorbed into the  
18 balance of the operations over the other two years.

19 THE COMMISSIONER: So they  
20 would have three years' employment?

21 A That's correct.

22 THE COMMISSIONER: One way or  
23 another?

24 A The opportunity for it,  
25 yes.





1 WITNESS MIROSH:

2 A Perhaps I could make one  
3 point here. In the cleanup operation which would involve  
4 utilizing the same type of equipment -that was used in  
5 the grading operation, which would be performed the  
6 next two years after clearing, would be carried out,  
7 as a continuation of the first year's clearing and  
8 grading operation, this would involve the stabilization  
9 and the erosion control. Here we not only had thoughts  
10 of extending the period of activity but also to place  
11 northerners in the inspection positions for both  
12 clearing, grading and clean up.

13 WITNESS KOSTEN:

14 A I would like to add the  
15 comment that it is not mandatory to do a clearing and  
16 grading operation during the one year period. We have  
17 set our plans this way, but that is not mandatory. It  
18 could be done over the period ahead of the pipeline  
19 construction.

20 Q Yes, immediately ahead.

21 A Well, one season. You  
22 have two seasons of pipeline construction.

23 I think the point that, at  
24 least I was trying to make, was that the year ahead  
25 would provide them with an opportunity to become familiar  
26 with equipment and thus possibly for those that wished  
27 to, become trained in the operation of that equipment,  
28 that this would give a better opportunity.

29 Q All right let me just  
30 pursue this with one other query If any of these people,



1 northern natives, let's suppose they were involved in  
2 clearing and grading, which you say are described as  
3 unskilled but you may think a better choice of words  
4 would be relatively unskilled or something like that.  
5 But, let us suppose they graduated to do something  
6 connected with pipe laying, operating one of the bull-  
7 dozers, in line with the side booms and so on.  
8 Or running a trenching machine.

9 A Yes sir.

10 Q Now to pursue that  
11 calling, they would then be -- have to wait for the  
12 looping of the pipeline to get more work along the  
13 line or they would have to go south or to some other  
14 part of the world where there was some pipeline work  
15 going on. If they wanted to pursue that skilled, highly  
16 skilled and no doubt extremely remunerative calling.  
17 Is that what you would expect of them? That's what you  
18 would expect of a man from Toronto or Vancouver isn't it?

19 A Well I suppose if they  
20 were interested in pursuing that as a trades career, then  
21 they would have to go where the work is.

22 THE COMMISSIONER: Let's take  
23 a five minute break and then you can carry on. You want  
24 to finish tonight and I've taken up a lot of your time.  
25 I'm sorry.

26 MR. BAYLY: You've taken up a  
27 lot of my questions here so I won't be much longer.

28 THE COMMISSIONER: Well we'll  
29 take a little break.

30 (PROCEEDINGS ADJOURNED FOR FIVE MINUTES)



(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: Well so ahead, Mr. Bayly.

MR. BAYLY: Yes.

Q Gentlemen, following the last few questions, I'm interested in knowing whether or not you contemplate that there are enough skilled people to do the skilled trades at the time that you would contemplate starting construction, or will you in fact have to train people in some trades so there will be enough to work on a project of this size?

A I anticipate that you would have to start with some people that lacked hardened experience.

Q And if you were to do that, what sort of lead time would you need to train some of these people?

A Well the lead time in terms of a training program -- the training programs are normally association managed programs are normally run on a semi-annual basis, in terms of lead time this doesn't -- it's not a problem in terms of lead time for the people that are on the project, or land on the project if you want, and have to be trained. There is a period of time with most of the people to get organized into a working unit, as part of a crew. If that's the kind of lead time you're talking about, your lead time would be when they hit the project.





1 Q All right, so some of the  
2 training would be on the job and couldn't be trained  
3 for before you set up your construction teams, if you  
4 like, for individual jobs on the project, but I would  
5 anticipate from your earlier answer that there are some  
6 jobs for which actual training might be required in some  
7 skills, before you get the men assembled at the various  
8 construction sites?

9 A Yes, sir.

10 Q And when would you contem-  
11 plate either doing this if you're Foothills, or recommend-  
12 ing to Foothills that they begin to do this training?  
13 Would it be prior to regulatory approval or not until  
14 after?

15 A I think that's a matter of  
16 policy that Mr. Mirosh would have to answer.

17 WITNESS MIROSH:

18 A Well the bulk of the train-  
19 ing I don't imagine would occur until after approval,  
20 but we are participating in Nortren, and in this way  
21 certainly encouraging training at this time.

22 Q All right, so you are  
23 doing some training programs, apart from those that you  
24 mention in your prepared evidence that have been can-  
25 celled during '74 and '75?

26 A Yes. You are no doubt  
27 aware, and it's been mentioned before, that Alberta Gas  
28 Trunk Line has a number of people which for the last  
29 several years have been in training from the north,  
30 working on the pipeline in the south. So this will



continue as we move into a stage where we would anticipate getting regulatory approval. This would no doubt be increased as well.

Q Now, one of the impacts that I'm informed is part of any large project and seems to have been part of the Alaska oil pipeline project, is that a certain number of people are killed or injured on a project. Have you gone into, in your construction thinking, what sorts of numbers of people you would contemplate being either killed or injured as a result of the construction of this project?

WITNESS KOSTEN:

A I have done no statistical analysis on that subject, no sir.

Q Has anybody for Foothills?

WITNESS MIROSH:

A Not that I'm aware.

Q All right. It is something you have to take into account though, I understand, in a project of this kind?

A Well I'm not sure how you would take it into account. Of course you would attempt to apply the best safety measures during construction you could. As to what help it would do you if you were to project some numbers, taking that into consideration that you are doing the best you can, I'm not sure.

Q Well given that you want to be safe, you have to contemplate the kinds of accidents that are most likely and the procedures that you want to have your workers follow to avoid this kind of



Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Bsyly

1 thing I would think. Would that be fair to say?

2 WITNESS KOSTEN:

3 A The Pipeline Contractors'  
4 Association over about the last 15 years, I believe, has  
5 been evolving and continually updating a safety manual  
6 that is, if you want the rule book when you come to  
7 building a pipeline project, yes.

8 Q When you were making your  
9 decision not to work in the cold dark months, did this  
10 safety factor and the possibility of deaths and injuries  
11 in the dark, cold time enter into this decision --

12 A Most certainly.

13 Q -- and influence it at  
14 all?

15 A Yes sir, most certainly.

16 Q So it would be fair to say  
17 that Foothills thinks that there might be more accidents  
18 if it were to work in the dark, cold times than other-  
19 wise?

20 A Yes.

21 WITNESS MIROSH:

22 A Yes, in a qualitative  
23 sense, not in a quantitative sense, yes.

24 Q And in a qualitative  
25 sense, does that mean there would be more serious  
26 accidents?

27 A No sir. What I am saying  
28 is not in the quantitative sense in that we haven't  
29 projected the numbers that you were asking, but in the  
30 sense that we do anticipate that there would be more



1 potential injuries in the darkness, yes, this has been  
2 taken into account.

3 Q Now if we could move to  
4 you, Mr. Jarvis and the snow road project, I take it  
5 from the answers we've been given on the construction  
6 season that's contemplated and comparing it with your  
7 snow road projections, that you were asked for general  
8 projections of when you thought snow roads would be  
9 available, rather than one based on the anticipated  
10 construction season?

11 WITNESS JARVIS:

12 A Yes, that's right.

13 Q And when you had taken  
14 into account your beginning of the building of snow  
15 roads, had you taken into account not only snow fall but  
16 the harvesting of snow and the use of snow fencing to  
17 gather snow from the earliest possible times that you  
18 could start the construction of a snow road, or does  
19 that not come until a later stage?  
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1 A I'm afraid I don't  
2 quite follow the question sir.

3 Q Let's look at spread one  
4 and two.

5 A Okay.

6 Q And in your colour bars  
7 on this chart, we have a projection of various dates,  
8 when -- the earliest possible dates when you could start  
9 your preparation, your construction, and your haul.  
10 Does that also reflect the time when you can get on  
11 the lakes, if you have to harvest from lakes and does  
12 it also take into account when you can start gathering  
13 with snow fences, with --

14 A If you're referring  
15 to the construction phase it does. What you've said  
16 is correct. It does reflect the time that you could  
17 get onto lakes.

18 Q The thing that I get  
19 confused on in this chart are the three blocks in the  
20 left hand corner, in the top columns, can I take it  
21 from that that you can start preparing say for pre-  
22 paring the surface early in October?

23 A Yes, I indicated  
24 previously there were certain operations, that could be  
25 undertaken, preparatory operations. Those are, as I  
26 mentioned ploughing snow off ice, and perhaps packing  
27 in saturated peat areas, that type of thing with low  
28 ground pressure equipment.

29 Q Now, going into this  
30 harvesting question, certain questions were asked of



1 Arctic Gas about this. You would contemplate the  
2 necessity in some areas of harvesting snow from lakes?

3 A That may be possible, or  
4 it may be necessary to do that rather.

5 Q Now if it is necessary,  
6 when will you know that?

7 A You would know that  
8 probably -- if conditions were not -- if you didn't have  
9 enough snowfall by say the average date on which it is  
10 projected that you should start construction, then I  
11 think you should start thinking about the possibility  
12 of harvesting.

13 Q So it would be the year  
14 of construction and it would depend on the snowfall?

15 A That's right, yes.

16 Q Now how to you ensure  
17 that the lake that you are, at that time, contemplating  
18 taking the snow off, is of sufficient depth for you to  
19 take the snow off without the ice freezing down to the  
20 bottom of the lake?

21 A Right at the present time  
22 we don't know that, but in the winter program, it's  
23 projected to measure lakes and to observe their state  
24 now.

25 Q Now what is the depth that  
26 you would advise Foothills, what is the depth of lakes  
27 that you would advise Foothills to avoid taking snow  
28 from?

29 A It may not be related  
30 precisely to depth but the observations to date are



1 that certain lakes in the -- along the route of the  
2 pipeline freeze to the bottom and those are the lakes  
3 on which I would propose to Foothills that they gather  
4 snow.

5 Q You say it wouldn't  
6 depend on the depth but you would have to do a survey  
7 beforehand to see which ones froze to the bottom anyway?

8 A Yes, that's right.

9 Q Now, assuming you didn't  
10 have enough snow and you had to go back to a second line  
11 of lakes, would there be lakes that were -- that you would  
12 contemplate using that didn't freeze to the bottom under  
13 some circumstances?

14 A There may be under some  
15 circumstances yes.

16 Q What circumstances?

17 A You would have to have a  
18 very minimal snowfall conditions and given the area of  
19 lakes available along the pipeline route I'd say that  
20 that situation is very unlikely. However, should it  
21 occur, I would suggest that the snow be harvested around  
22 the edges of the lake.

23 Q Where it's going to freeze  
24 to the bottom anyway.

25 A Where it's going to freeze  
26 to the bottom anyway.

27 Q All right, now that  
28 assumes of course that you've done tests to see whether  
29 the lake is deepest in the middle or at the edges, is  
30 that right?





1 A Yes. that's right.

2 Not all Q Not all lakes are shaped  
3 like a wash basin; some are deep, at some ends and some  
4 in the middle and some in the trench throughout the  
5 length of the lake, so it varies.

6 A Yes.

7 Q Would you contemplate  
8 doing these kinds of surveys or recommending to Foothills  
9 that they do these kinds of surveys beforehand?

10 A I've made that  
11 recommendation to Foothills?

12 Q And what sort of things  
13 would you recommend to them or have you recommended to  
14 them to make sure that you don't take snow off say a  
15 fish over wintering lake that would cause a fish over  
16 wintering area to freeze to the bottom and kill the fish?

17 A Well, the recommendations  
18 I made are that we know quite a bit about the lakes before  
19 they went on them for any snow harvesting operations.

20 Q Did you make a recommendation  
21 in the form say of a check list of things that should  
22 be determined before any snow harvesting could be  
23 contemplated?

24 A Yes, I've had several  
25 discussions about that.

26 Q Okay, now did I miss that  
27 or is it not in a report form yet?

28 A No, that's not in the  
29 report and that information will likely not be available  
30 until this winter's field program is completed.



1 Q So you would be going back  
2 in this winter to make sure that the check list you've  
3 recommended is adequate?

4 A That's right and at the  
5 moment, we're using various field observations that  
6 have been made to date on the depth of lakes and so on.

7 Q Is it always a bad  
8 things for the things living in the lake to take the  
9 snow off?

10 A I don't really know.  
11 I'm not able to give you an answer on that.

12 Q And you had a discussion  
13 I gather with Mr. Williams -- do you think we should  
14 go into that at all?

15 A Pardon me?

16 Q You were looking at some  
17 reports of Mr. Williams over dinner and I wondered if  
18 you had gone into that sort of thing.

19 A I was able to only get  
20 two reports, two bits of information. One, a number  
21 of photographs of the test road at Inuvik and the  
22 other Mr. Williams testimony and I've read those over  
23 and there is some information, I recall some more than  
24 I did previously about those reports but I haven't been  
25 able to get the reports just yet.

26 MR. GENEST: I might say that  
27 our Inuvik Snow Road Report is missing from our library.  
28 I was going to send out a general inquiry to all my  
29 friends as to whether they have it or not.

30 MR. BAYLY: I don't have it, Mr.



1 Genest.

2 THE COMMISSIONER. It's been a  
3 much sought after item.

4 MR. GENFST. We'll try and  
5 replace it.

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1 Q In your experience in  
2 gathering snow for snow roads, are you aware of liter-  
3 ature which goes into the problems or lack of problems  
4 of taking snow off lakes?

5 A No I'm not aware of any  
6 specific report on that subject.

7 Q I gather it might have  
8 some effect on the amount of light that was able to  
9 the water if you took the snow off. Would that be  
10 fair to say?

11 A Yes, it could.

12 Q Now you have taken your  
13 projections for the availability of snow for snow roads  
14 from the weather statistics that are available along  
15 the route, is that correct?

16 A That's right, yes.

17 Q Now, I gather you run into  
18 some years, as apparently occurred in 1973 and '74 --  
19 1973-'74, when the snowfall in certain areas, and I'm  
20 referring here specifically to the Inuvik area was  
21 quite light?

22 A Yes.

23 Q Under those conditions  
24 would you contemplate any problems gathering enough  
25 snow or making enough snow to prepare the snow roads  
26 that Foothills would require?

27 A No, no sir.

28 Q All right. Assuming that  
29 there is a year with less snow even than that, and you  
30 did run into problems and you really couldn't get





1 enough snow, what would you recommend to Foothills?

2 A Well if that situation  
3 occurred, we have already gone through the first contin-  
4 gency plan, and that is to harvest snow from lakes.  
5 There would be a second contingency, and that would be  
6 to use snowmaking equipment.

7 Q All right. Say that you  
8 are in an area where you don't have enough lakes that  
9 you can take snow from, and you are faced with contin-  
10 gency three, what's it?

11 A Contingency three?

12 Q Yes?

13 A I'm in an area that I don't  
14 have enough lakes to take snow from. Can I take water  
15 from them?

16 Q Let's assume they don't  
17 have any water either.

18 A They don't have any  
19 water, so we don't have any lakes at all. Where is that?

20 THE COMMISSIONER: Well they  
21 just have ice, you can melt it -- would you allow him  
22 to melt the ice?

23 MR. BAYLY: Well he could do  
24 that.

25 Q What I'm referring to sir,  
26 there may be lakes in which there's water, but it may be  
27 water in which there are fish overwintering, in which  
28 case you might not want to take it.

29 A Okay, we will deal with  
30 that.



1 Q So this is how we get  
2 into contingency three, I assume.

3 A All right. DO you want to  
4 pursue that?

5 Q Yes, I have got you this  
6 far, that first of all there's no problem, and there's  
7 lots of snow, and secondly, there's a problem and you have  
8 to make snow with snowmaking machines, which means  
9 gathering water from a source and putting it through a  
10 snowmaking machine.

11 A Right.

12 Q All right. I will give  
13 you another contingency in which there's no snow, and  
14 there's no water that you can use.

15 A Well --

16 Q I'm trying to get you to  
17 admit that you are going to have to build a gravel road.

18 A Well that may be the  
19 assumption.

20 Q I think this is a serious  
21 question, Mr. Commissioner, because you do run into the  
22 kind of situation where the available water source might  
23 be very important to fish.

24 A Okay, I think I understand  
25 why the question is being asked, and I will try to  
26 answer it by saying that I did consider that third  
27 contingency, and what I came up with were a few very  
28 preliminary figures and they relate to, say building say  
29 10 miles of road, and with the snowmaking equipment  
30 that's available, estimating the withdrawal from a lake,



1 the necessary withdrawal.

2 To build 10 miles of road to a  
3 standard, say 18 or 20 inches of ice or snow on it,  
4 compact that, if you have a hundred acre lake in the  
5 area and you withdrew all the water that was required  
6 for that 10 miles of road from that one lake, you would  
7 draw the lake down six inches.

8 Now, to the extent that that  
9 may affect the lake, somebody else would have to judge.  
10 So I hope that --

11 Q All right, so that's the  
12 amount?

13 A Right.

14 Q All right. I gather that  
15 contingency may be less likely to arise in the example  
16 I gave you than in the possibility that your snow road  
17 starts to deteriorate faster than you anticipate, either  
18 because of the kind of traffic or because of an early  
19 spring. Can you repair a snow road in such a way as to  
20 perpetuate its life into the projected construction  
21 season, or do you have to abandon it?

22 A Well I think the first  
23 practice probably is to restrict travel.

24 Q To certain hours?

25 A To certain hours.

26 Q You mean to daylight  
27 -- to night hours?

28 A Yes. Well, evening, you  
29 know certain hours, I think that's a matter of field  
30 judgment as to what time the road is being -- the





1 surface of the road is being disturbed. You can usually  
2 travel quite late in the morning on it.

3 Q Okay, and then if you get  
4 into a situation where you have select areas that go  
5 bad, but the rest of the road is pretty good and the  
6 company wants to get another week out of it, what do you  
7 do in those select areas?

8 A Well in repair, if that  
9 situation did occur, the snowmaking equipment, it has  
10 been recommended that snowmaking equipment be available  
11 on the line to handle that situation, or areas that  
12 rutted during the winter.

13 Q And what temperatures do  
14 you require to make the snow?

15 A Well essentially below  
16 freezing is required. You would need a good freezing  
17 right throughout the night, in order to do this repair  
18 work.

19 Q And how many hours could  
20 you have the machine, the snowmaking machine running  
21 and still be making snow, would you think, when you are  
22 getting close to the end of the construction season?

23 A How many hours could the  
24 machine be run?

25 Q That's right. You're  
26 running into a situation, I take it, where because of  
27 temperature and the pressure of the vehicles going over  
28 it, that you're getting melting occurring and rutting  
29 occurring in the snow road surface.

30 A Well the length of time



1 over which that measure is effective would depend on  
2 temperature, the degree day accumulation.

3 Q So you might have to have  
4 quite a lot of snowmaking machines for short periods of  
5 time during the cooler parts of the day in order to do  
6 your repairs in any one location?

7 A If you wished to extend  
8 the road for a period.

9 Q All right.

10 A Well beyond the figures  
11 that are here.

12 Q Apart from the use of snow  
13 or ice, are there other things you can use, or would  
14 contemplate using, in order to stretch out the life of  
15 those snow roads?

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1 A Nothing that I'd really  
2 want to recommend.

3 Q So you wouldn't recommend  
4 stripping it away and putting down a gravel surface for  
5 the 100 yards that are in bad shape.

6 A I think if you got to that  
7 stage, you'd be working against nature and that's not  
8 a very good idea.

9 Q So it would be your  
10 recommendation under those conditions to stop and  
11 start again next season?

12 A That's right.

13 Q At what point -- not  
14 this may go to tests that you haven't done or haven't  
15 had an opportunity to do yet, at what point do you  
16 declare that the snow roads life is finished. That is,  
17 at what point do you have enough surface to protect  
18 what's underneath the snow road so that you can use it.

19 A Well the road begins to  
20 deteriorate from the top.

21 Q Yes.

22 A And once it begins to  
23 rut seriously, you should stop using it.

24 Q So that is your signal,  
25 it's not when the mud starts to appear but when you start  
26 to get ruts in the snow surface?

27 A Yes, when the road has  
28 been performing satisfactorily and the temperature--  
29 you begin to get melting on the surface and rutting, then  
30 you should get off the road.



1 Q Mr Williams showed us  
2 some pictures and maybe they were the same that he showed  
3 you, of the Inuvik snowroad project and there were some  
4 points that went bad before others and there were some  
5 repairs done and they were done with binding mediums  
6 such as sawdust and water turned to ice and that I  
7 gather perpetuates the life in certain soft spots for  
8 a period of time?

9 A Yes, it could, for a  
10 period of time.

11 Q And in the roads that you  
12 built in Manitoba, did you use that kind of devise to  
13 perpetuate the length of the life of them?

14 A Id' say that we used  
15 water and snow to do repair work but not, we never  
16 attempted to extend the life of a snow road, beyond a  
17 reasonable performance.

18 Q All right. I may have been  
19 unfair to Mr. Williams, he may have been doing repairs  
20 too rather than trying to extend the life of the snow  
21 road. He's nodding yes.

22 Now on page 25 of your  
23 prepared evidence, you refer to the construction -- this  
24 is you again, Mr Jarvis, you refer to the construction of  
25 your bridges, over certain river crossings, by flooding,  
26 and you refer to that as an accepted method although  
27 you have certain reasons for not using it in some places.

28 A I suggested, I think, that  
29 snow making equipment would be quite useful in this  
30 operation.





1 Q All right, so you would  
2 want to turn the water to snow before putting it on the  
3 surface of the crossing?

4 A The unit should be  
5 probably such to produce slush.

6 Q And does that use less  
7 water or more water than just flooding?

8 A It would be about the  
9 same I think.

10 Q What you have then is a  
11 mixture with a little more air in it than if you just  
12 flooded it and turned it to straight ice, is that right.

13 A I guess that's right.

14 Q And that would mean that  
15 it would be lighter. Is that the effect you're  
16 trying to get is to have a lighter road?

17 A That's not the purpose.  
18 that I'm suggesting using snow making equipment. The  
19 intent there is to prevent the situation that sometimes  
20 occurs on flooding and icing, making an ice bridge that  
21 you trap water in between layers of ice and the road is  
22 not -- doesn't perform nearly as well, and you're liable  
23 to break through in these areas and so on.

24 Q What you create by this  
25 is a more gradual build up?

26 A Yes, and a more positive  
27 uniform build up on the ice bridge.

28 Q Have you done this before  
29 or is this a prognosis?

30 A No this is -- it seems to



1 me to be a good idea to do that.

2 Q But this isn't a technique  
3 you've employed <sup>in Manitoba</sup> in making snow roads?

4 A No, it's always been  
5 flooding.

6 Q Would you be doing  
7 experiments on that this winter?

8 A I haven't made any  
9 recommendations on that.

10 Q Mr. Mirosh, would you  
11 anticipate experimenting with that technique before  
12 getting it to the crossing?

13 WITNESS MIROSH:

14 A Yes, we would likely  
15 carry out that kind of an experiment prior to con-  
16 struction and hopefully after the application.

17 Q In reference to a question  
18 that Mr. Genest asked you concerning the facilities  
19 you would have to guide your helicopters to the  
20 helipads, you talked about using a radio beacon. Now  
21 would you contemplate having somebody on site at your  
22 camp to make sure that the beacon was always on  
23 frequency or not?

24 A Well during construction  
25 this would unquestionably be true but during operations.  
26 the stations ultimately would be unmanned.

27 Q All right. Would you, as  
28 the company or would you suggest to the company that they  
29 have somebody servicing these on a rotating basis then  
30 after construction?



1 A Yes, this would be part  
2 of our operations and maintenance requirement.

3 Q Now, I'm taking your --  
4 just one more question going back to your rate of  
5 progress here. I've taken your figure of days. Can  
6 we break that figure down into the number of hours that  
7 you would contemplate your men working?

8 WITNESS KOSTEN:

9 A Well, this will vary from  
10 crew to crew, but generally ten to 12 hours. This is  
11 what the men would be paid, the travel time involved  
12 normally going out to the job from the camp is normally  
13 time that is paid.

14 Q I see, and would that  
15 occupy as much as two hours per day? Back and forth?

16 A The spacing of the camps  
17 I would expect it to be within an hour, it depends on the  
18 distance your operation is from the camp.

19 Q Is that an hour out and  
20 an hour back?

21 A That is correct, but  
22 the quitting time is on the job.

23 Q Yes but --

24 A In other words, you don't  
25 pay them for the return time in most cases.

26 Q You pay them for 11 hours.

27 A Ten hours, in which case  
28 9 are productive and if it's generally if the time is  
29 one hour, then the productive time is one hour less than  
30 what your crew works.



1 Q How many days a week would  
2 this be?

3 A I anticipate it would be  
4 seven days a week.

5 Q And have you looked into  
6 the labour ordinance in the Northwest Territories to  
7 see whether the number of hours that would be worked by  
8 the crew is in compliance with that Ordinance?  
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1 A The Ordinance?

2 Q Yes.

3 A I would have to say no to  
4 that specific question. We based it on the labour  
5 agreements more than the Ordinance. I don't know what  
6 the hours are under the Ordinance.

7 Q Would you contemplate  
8 looking into the Ordinance --

9 A Oh yes, certainly.

10 Q -- to see what it --

11 A The various regulations,  
12 yes.

13 Q I think you will find  
14 that's Section 5 of the Ordinance.

15 A We will check into it.

16 MR. BAYLY: Those are all the  
17 questions I have, sir.

18 MR. SCOTT: Mr. Templeton wants  
19 to, after a long absence, to participate. Perhaps he  
20 would be next, Mr. Commissioner.

21 THE COMMISSIONER: Well --  
22 yes, I take it that I am to infer from that you think  
23 we ought to adjourn.

24 MR. SCOTT: I was going to  
25 hope that like the pipelines, we could have two weeks  
26 at Christmas too.

27 THE COMMISSIONER: We will  
28 start pipe laying January 1st.

29 MR. GENEST: I think we have  
30 broken the labour ordinance today, sir.



1 THE COMMISSIONER: Well you  
2 should have been to the community hearings.

3 Well we will adjourn then until  
4 9:00 a.m., and I should say that if any other counsel  
5 want to pursue the questions that I had raised, Mr.  
6 Williams was kind enough during the break to refer me  
7 to Arctic Gas' responses to the Assessment Group's re-  
8 quest for supplementary information, and Table 4 on  
9 page 2-8 gives the relative skills, skilled classificat-  
10 ions on a typical construction spread, so we are  
11 adjourned until 9:00 a.m.

12  
13 (PROCEEDINGS ADJOURNED TO TUESDAY, SEPTEMBER  
14 23RD, 1975 AT 9:00 A.M.)  
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347

M835

Vol. 66

AUTHOR

Mackenzie Valley pipeline inquiry:

Vol. 66

22 Septmener 1975.

DATE DUE

BORROWER'S NAME

347

M835

Vol. 66







MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTER OF APPLICATIONS BY EACH OF

- (a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE YUKON TERRITORY AND THE NORTHWEST TERRITORIES; and
  - (b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE NORTHWEST TERRITORIES,
- FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION, OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE PROPOSED PIPELINES

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.  
September 23rd, 1975

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PROCEEDINGS AT INQUIRY

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Volume 67

CANADIAN ARCTIC  
GAS STUDY LTD.

SEP 30 1975

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APPEARANCES:

1		
2	Mr. Ian G. Scott, Q.C.	
3	Mr. Stephen T. Goudge,	
4	Mr. Alick Ryder and	
5	Mr. Ian Roland	for Mackenzie Valley
6		Pipeline Inquiry;
7	Mr. Pierre Genest, Q.C.	
8	Mr. Jack Marshall,	
9	Mr. Darryl Carter,	
10		for Canadian Arctic Gas
11		Pipeline Limited;
12	Mr. Reginald Gibbs, Q.C.	
13	Mr. Alan Hollingworth	for Foothills Pipelines
14		Ltd.;
15	Mr. Russell Anthony,	
16	Prof. Alastair Lucas	
17		for Canadian Arctic
18		Resources Committee;
19	Mr. Glen W. Bell and	
20	Mr. Gerry Sutton	for Northwest Territories
21		Indian Brotherhood and
22		Metis Association of the
23		Northwest Territories;
24	Ms. Leslie Lane	
25		for Inuit Tapirisat of
26		Canada and the
27		Committee for Original
28		Peoples' Entitlement;
29	Mr. Ron Veale and	
30	Mr. Allen Lueck	for Yukon Native Brother-
31		hood;
32	Mr. Carson H. Templeton	for Environment Protect-
33		ion Board;
34	Mr. David Reesor	for Northwest Territories
35		Association of Muni-
36		cipalities
37	Mr. Murray Sigler	
38		for Northwest Territories
39		Chamber of Commerce



## INDEX OF WITNESSES

### WITNESSES FOR FOOTHILLS PIPE LINES LTD.

#### PANEL 10 - PHASE 1

E.A. MORISH

A.F. BAUER

W. KOSTEN

P. JARVIS

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- Cross Examination by Mr. Scott	9901
- Re-Examination	I0026
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Yellowknife, N.W.T.

September 23, 1975

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR SCOTT: Mr. Commissioner,  
I think Mr. Templeton is next.

E.A. MIROSH, Resumed

A.F. BAUER, Resumed

W. KOSTEN, Resumed

P. JARVIS, Resumed

CROSS-EXAMINATION BY MR. TEMPLETON:

Q Mr. Bauer perhaps I  
could start with you. As I understand it, you're  
going to on page -- I'm not sure I've got the right  
page number, but it's question 11 I believe. You're  
going to clear a year ahead of construction, right?

WITNESS BAUER:

A Yes, in general.

Q And you're going to use  
machine clearing in some of it?

A Some areas machine  
clearing, some areas hand clearing?

Q In the summer or winter?

A That would be winter.

Q Are you going to burn  
the non saleable timber?

A We're contemplating  
using wood chippers wherever practical and applicable.

Q This takes the nitrogen  
out of the soil though doesn't it?

A I beg your pardon?



1 Q This takes the nitrogen  
2 out of the soil?

3 A Wood chippers, no they  
4 are commonly used in the B.C. Forest Industry, they  
5 just chip the branches and so off and spread it around.

6 Q It doesn't take the  
7 nitrogen out of the soil?

8 A I'm not a soil expert.  
9 I couldn't answer that.

10 Q So you're not going to  
11 be burning then?

12 A Not if we don't have to.

13 Q Well what do you mean by  
14 what would make you burn then. What I'm really trying  
15 to get at is, what the environmental problems associated  
16 with <sup>this</sup> and it makes a difference. If you're starting  
17 a year ahead and you're burning, and in a permafrost  
18 area, what are the environmental effects of this.  
19 When would you burn?

20 A I would say burning would  
21 be one of the last resorts that we would adopt for  
22 clearing. Because if you employ wood chippers, then  
23 most of the debris left you can feed through the  
24 wood chippers and provide sort of organic matter that  
25 way.

26 Q Perhaps we'll come back  
27 to this in the environmental phase. I think one of  
28 the things that I'm trying to get at in this and a  
29 number of questions, is a more clear definition of  
30 precisely what you're going to do so that somebody can





1 predict the environmental impact and it's all very well  
2 to say I have a range of operations available to me,  
3 and I'll use them as I see fit, but I think if you  
4 do that you should at least say what are the environ-  
5 mental effects of this and under what conditions are  
6 you doing it. In other words, there are environmental  
7 as well as economic costs,

8 A I believe our environ-  
9 mental panel will deal with those matters in detail.

10 Q But how do you make  
11 these decisions, are they made on an economic grounds  
12 and the environmentalists come along later and say,  
13 I'll explain it.

14 A No, those decisions are  
15 made by consultation with both parties, meaning the  
16 engineering or construction planning and environmental.  
17 It's just to find the most applicable methods, which  
18 are widely used in the industry.

19 WITNESS MIROSH:

20 A I might add that the  
21 environmentalists advised us that if we use wood  
22 chipping, we should not use this process near streams  
23 or water courses, because of the concern for fish life  
24 and the effect that such wood chips would have on  
25 water ways.

26 Q I think what I'm trying  
27 to get around is are environmental matters taken up  
28 when you're doing something or, I didn't get that  
29 answer, that we're going to use chipping or we possibly  
30 might use burning, but it didn't come out to me that you



1 were considering the environment when you were making these  
2 decisions?

3 A Well we have had discussions  
4 with our environmentalists and it is fair to say that  
5 we've also discussed using burning sleds for burning  
6 certain woods and also that we would be locating  
7 merchantable timber in piles along the right of way, but  
8 as to specifically where each of these activities would  
9 take place, that hasn't been laid down.

10 Q Well do you intend to do  
11 that before you finish your application?

12 A Yes, it would be our  
13 intent to be more definitive as the - - as we carry on  
14 with further stages.

15 Q I recognize your problem.  
16 You started late and you got a long way to go and I can  
17 certainly sympathize with you but somewhere along the  
18 line of each application, needs a position to say now  
19 I'm going to do my detailed design later on, but I now  
20 know what I'm going to do , the conditions under which  
21 they would be done and so that other people can look  
22 at it and say, what are the environmental impacts. I  
23 have difficulty always receiving a list of tools to do  
24 a job without saying when they're going to be used, and  
25 how they're going to be used, and what is the environmental  
26 implications of them.

27 Perhaps I can leave that and  
28 no doubt we'll be back to that in the environmental  
29 stage, phase. On question 12, I think -- yes, question  
30 12 you mention the use of granular material in the first



1 paragraph. Do you know where you're going to get this  
2 material?

3 WITNESS BAUER:

4 A Well we do have a  
5 fair idea about available borrow sites subject to more  
6 detailed subsoil investigations to find out what they  
7 contain.

8 Q Well the borrow sites  
9 do have, in the removal of the material, does have  
10 environmental implications as do the roads getting to  
11 them and whether they're going to be snow roads or  
12 permanent roads is -- does have a considerable amount of  
13 environmental implications as does the removal of the  
14 material itself because it's a resource.

15 Once again, I have difficulty accepting the idea that  
16 the north is a resource on which you draw. I personally  
17 can't accept that and I get this perhaps an unfair but  
18 -- feeling that you will use the north to build your  
19 project, and I think the purpose of these hearings is to  
20 say, now what is the effect, what are the costs of this?  
21 I have difficulty accepting the idea that you're going to  
22 use snow roads or permanent roads or whatever is con-  
23 venient at the time, without saying in advance what ~~ae~~  
24 the costs of it? I realize I'm being unfair to you,  
25 because you haven't at it that long, but the hearings  
26 are here and what are we going to do?



1 THE COMMISSIONER: I think the  
2 panel is treating that as a rhetorical question.

3 MR. TEMPLETON: I never learned  
4 how to ask a question yet, but perhaps Mr. Scott is  
5 going to get me taught yet.

6 MR. SCOTT: We will see later,  
7 Mr. Templeton, whether you have learned how to answer  
8 them.

9 MR. TEMPLETON: Perhaps I  
10 should sit down now, but I'm not.

11 Q Do I gather that the  
12 grading operations are done <sup>in</sup> general a year in advance  
13 of the construction, the preparation of your pad on  
14 which you work?

15 WITNESS MIROSH:

16 A Yes, we would plan on  
17 preparing those areas that are cleared where they  
18 require grading, immediately following the clearing  
19 operation and where required, we would implement stabil-  
20 ization and erosion controls at that time as well.

21 Q Well now let's take a  
22 situation where you are on the side hill in the perma-  
23 frost areas with ice rich soils similar to north of  
24 Norman Wells, and you go in and grade that so that you  
25 have a flat surface on which to work. Now, what are  
26 you going to do about the melt-out of the permafrost  
27 during that period?

28 A Well if it was a fine-  
29 grained ice rich area, this would not be done until just  
30 prior to construction.,





1 Q So you would not be doing  
2 it ahead of time?

3 A Not in what we have called  
4 sensitive permafrost areas.

5 Q But isn't most of the  
6 area, the length of the line north of Norman Wells in  
7 silts with a considerable amount of ice?

8 A Well there may be ice, but  
9 as to whether most of that area is fine-grained, that is  
10 something that we have said we would determine by final  
11 geotechnical investigations.

12 Q But silt is fine-grained  
13 surely?

14 A Yes.

15 Q And don't the borings  
16 along the route north of Norman Wells contain a large  
17 percentage of silt and an increasing amount of ice  
18 lensing as you go north?

19 A Yes, but there are areas  
20 of granular material as well in the north.

21 Q What would you say the  
22 percentage of granular material was in that area?

23 A Well, I don't know.

24 Q Five percent?

25 A No, I would put it the  
26 other way around. Perhaps we are talking for the entire  
27 pipeline about 200 miles of sensitive permafrost  
28 terrain.

29 Q Sensitive permafrost being  
30 regarded as a silty type of soil with excess ice or does



1 it have a slope, a component to it? How do you define  
2 sensitive --

3 A Well it would be fine-  
4 grained ice rich soil.

5 Q It doesn't have anything  
6 to do with the slope?

7 A Well the slope certainly  
8 affects the stability that you will be faced with re-  
9 claiming and with the erosion control techniques, but  
10 as to our clearing, we have said we would leave clearing  
11 of sensitive permafrost areas until just prior to actual  
12 pipeline construction, and therefore, grading would only  
13 occur on these areas just prior to pipeline construction.

14 Q So that's done then in the  
15 winter in which you are going to do the construction?

16 A Yes.

17 Q So that the preparation of  
18 this is dependent again on the snow roads, is that  
19 right? To get your equipment in to prepare the pad on  
20 which to work, you have to have a road to get the  
21 equipment in?

22 A Yes.

23 Q So that I suppose you're  
24 saying that you would start bringing your equipment in  
25 sometime in December, as soon as you can get a snow road  
26 built?

27 A Yes, the green lines that  
28 we were talking about yesterday on the snow road  
29 charts.

30 Q Then you have Christmas



1 period in which you grade the material to form a flat  
2 pad because quite a lot of this area is side hill, eh,  
3 is it not? It is 'either muskeg or side hill, or one or  
4 the other pretty well, isn't that right?

5 A There is a lot of rolling  
6 terrain, yes.

7 Q And it slopes basically  
8 towards the river and you're running along the river,  
9 parallel to the river?

10 A Yes, we have attempted in  
11 our line location to minimize this, but there are inevi-  
12 tably side slopes.

13 Q Well I'm not clear how  
14 you are going to get that working pad graded in that  
15 period between when you can get on a snow road, and when  
16 Mr. Kosten says he's going to start construction at the  
17 last week of January.

18 A Well the operation will  
19 immediately precede pipeline construction.

20 Q So that you really have a  
21 spread working ahead of the pipeline spread, construct-  
22 ing roads, constructing a pad, I am sorry.

23 A Well it may be consider-  
24 ably ahead if there is a large cleared area that the  
25 pipeline crew could be working on.

26 Q Are you going to be working  
27 over the Christmas vacation?

28 A I think yesterday we had  
29 discussed that the pipeline construction operations  
30 would not occur until after January.



1 Q Yes, I realize that but I  
2 am talking about the pad construction operation.

3 A There may be some work  
4 going on here at that time, since clearing and grading  
5 will be, in our view, carried on largely by northerners.  
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1 Q Material is frozen,  
2 that you're going to grade, material that you're going  
3 to use to construct the pad.

4 A Yes, in large measure  
5 it will be frozen.

6 Q Are we talking about  
7 it will be frozen won't it, because it's done in  
8 Christmas time or after and you're assuming that to get  
9 in there, that it's below freezing so that you can  
10 build a snow road. In fact it's below zero, to build  
11 the snow road, I think, so it is frozen isn't it?

12 A Well the surface would  
13 be frozen. It's a matter of degree days as to how far  
14 the frost will penetrate into the active layer at any  
15 particular time.

16 Q Yes, but the snow road  
17 must be, if it's going across swamps and -- it must  
18 have built up a frost layer to carry the equipment.  
19 The snow road itself isn't a bridge so that it must  
20 rely on the underlying soil.

21 A Yes.

22 Q So it's got to have  
23 certainly a foot of frost in there, or more, if you're  
24 going to go across a swamp.

25 A Yes I think Mr. Jarvis'  
26 curves did take that into account, the degree days  
27 which are required to form a solid base are implicit in  
28 those green bars that he had created.

29 Q Well I didn't see anything  
30 to do with penetration of frost.



1 A Well perhaps Mr. Jarvis  
2 has more to add there.

3 WITNESS JARVIS:

4 A Yes, that certainly is  
5 the basis on which the criteria were established.  
6 On the degree day criteria, it's frost penetration.

7 Q How do you convert degree  
8 days to frost penetration?

9 A Well sir, the method that  
10 I used was to refer to the National Research Council  
11 data, published data on that subject.

12 Q Could you give me the  
13 quotation or the citation for that please?

14 A Yes sir it's NRC  
15 publication, 12881.

16 Q Perhaps I better read  
17 that. On the -- I guess it's  
18 still on question 12, on the fourth line from the top,  
19 this is accomplished by cutting and filling with the  
20 necessary preventative measures to avoid deterioration  
21 of the slopes. What are these preventative measures  
22 please?

23 WITNESS MIROSH.

24 A Could you give us that  
25 reference again please?

26 Q I've got it on page 13,  
27 I think but I'm not sure that's the -- it's not  
28 numbered. It's question 12 second page of question 12.

29 A Yes.

30 Q Fourth line from the top,



1 or starting from the top of the page, "where extensive  
2 side slopes are encountered along the right-of-way  
3 in order to facilitate safe operations. right-of-way  
4 preparation is required to provide a level working  
5 surface. This is accomplished by cutting and filling  
6 with necessary preventative measures to avoid deterior-  
7 ation of the slopes."

8 What are these in permafrost  
9 areas?

10 A Well the geotechnical  
11 section of the application gave a number of examples,  
12 of this. Did you want me to attempt to recall some  
13 of these?

14 Q I read that and I didn't  
15 get your whole preventative measure of how you're going to  
16 take a side hill, in a permafrost area, and how you're  
17 going to prevent deterioration or even keep it to a work-  
18 able level unless you're going to use granular material.  
19 If you're going to use granular material, then that's  
20 a different matter, but that involves environmental  
21 impacts.

22 A Yes, granular material  
23 was one method proposed as an insulation. There are  
24 other things we're looking at. There's a type of fabric  
25 which might be used, which I believe is called mer-  
26 thaty or mertafy I forget which. It's been used  
27 successfully to stabilize slopes. There is also the  
28 concept of allowing the cut surface on the side of the  
29 slope to seal itself. There was some reference made  
30 to that in making the slopes, slope cuts at a very steep



1 angle so that the slope can settle, the tundra can  
2 actually seal itself after the ice has melted from the  
3 exposed surface and this has been used in Alaska in  
4 highway construction quite successfully up to cuts of  
5 some 12 to 15 feet.

6 Q  
7 I think it's only partially  
8 successful. It was used on the Dempster Highway as well  
9 wasn't it, and it was sometimes successful, sometimes it  
10 was not.

11 A Yes, well I think it's  
12 a matter of -- at least the people that we've talked  
13 to that have been familiar with this method, it's a  
14 matter of ensuring that the mat remains intact where  
15 the slope is settling down and sealing. In other words,  
16 one has to cut trees back a ways so that when the slope  
17 starts to slump that the trees don't fall over and  
18 pull the tundra out. If this method is used, then  
19 apparently the slopes do seal relatively well.

20 Q Well once again, this  
21 is a technique, and I don't dispute it, but I don't --  
22 what I'm having difficulty with is when and under what  
23 circumstances you do it and it's one thing to say  
24 I have a battery of techniques available to me, but  
25 when the job starts in the field, the people may not  
26 know precisely how to do it and we have found over and  
27 over again that although the technology was available,  
28 it just didn't work. I have been after Canadian  
29 Arctic Gas to be more specific and I think that you  
30 should too if you're going to say I have techniques to  
31 say how you're going to use these techniques.





1 And how are they going to be -- how are they going to  
2 get to the people in the field that are going to be using  
3 them.

4 A Well we will be more  
5 site specific as we accumulate more site specific  
6 information and this/<sup>as</sup>has been stated before, will be  
7 the primary purpose of our geotechnical program after  
8 we receive a permit.

9 Q You say you're going to  
10 be site specific after you receive the permit, but  
11 I think it's incumbent on you to say what's<sup>the</sup> environmental  
12 impact before you receive the permit. and how you're  
13 going to build it because the requirements of this  
14 Commission are to spell out the terms and conditions  
15 and either they're going to have to do it or -- I  
16 shouldn't say they, or you're going to have to do  
17 it and they judge you on it, isn't that right?

18 A Well we are being site  
19 specific at the present time in that we have been in the  
20 field, but it's a matter of evolution. One continues to  
21 build up knowledge, and we will increase this knowledge  
22 more exponentially I suppose after we have a signal  
23 that we will be able to carry out the project.

24 Q I don't -- I'm having  
25 difficulty accepting the idea that the project, what I  
26 call a project description, precisely how you're going  
27 to do something, and I recognize that you can't ask for  
28 the complete detailed design of everything in the project,  
29 but I can't accept the idea -- I don't know how you  
30 are going to make an impact statement if you don't know



1 how you're going to build it. I think you need a  
2 pretty detailed description of what you're going to do  
3 and how you're going to do it and then say this is the  
4 environmental and social impact and then the Commissioner  
5 can judge. I have difficulty accepting that all site  
6 specific things are going to be done after you get a  
7 permit.

8 A Well not all because we  
9 are doing some site specific work right now but it's a  
10 matter of degree. We have been in the field. we've done  
11 some geotechnical investigations, we've determined how  
12 we would solve some problems and we've made an impact  
13 statement on these.

14 Q Well do I gather that you  
15 consider the impact statement that you have provided  
16 in your application as adequate?

17 A Well it's adequate for the  
18 stage that we're at which is a preliminary stage?

19 Q Well I meant is it  
20 adequate for the applications?

21 A Well it does show our  
22 intent to carry out methods and procedures which will  
23 ensure that the environment will be secure and that the  
24 pipeline will be secure after it's built.

25 Q Well, I didn't get quite  
26 the answer that -- I really think -- I was really asking  
27 is the environmental impact statement that you've  
28 provided with your application, in your opinion  
29 adequate for the purposes of this Commission?

30 A Yes.



1 Q I see.

2 THE COMMISSIONER: Well that  
3 settles it doesn't it?

4 MR. TEMPLETON: Well it's  
5 settled in his mind anyway.

6 Q Now to Mr. Jarvis, I  
7 think. Yes, Mr. Jarvis, page 24, question 14, the  
8 rest of my questions I'll try to be as brief as I can  
9 are on winter roads and I think Mr. Jarvis, the  
10 whole -- your whole operation is predicated on your  
11 ability to use winter roads. Is that right?

12 WITNESS JARVIS:

13 A Yes, I believe that's  
14 a fair statement.  
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1 Q And the misuse of them can  
2 have serious environmental implications?

3 A I agree entirely, yes.

4 Q So it's a very crucial  
5 subject, the matter of winter roads, and have you found  
6 out about the -- remember part of the Alyeska applicat-  
7 ion included the use of winter roads. Not the whole  
8 route, but part of it. Did you investigate whether they  
9 actually used those winter roads or not?

10 A I understand that they  
11 opted not to use these winter roads.

12 Q Yes, even though they  
13 -- or even though the application said they would use  
14 them, they didn't use them.

15 A I believe that's the case,  
16 yes sir.

17 Q And that the production  
18 of great trenches of melting permafrost during summer  
19 construction was considered by some back to the days of  
20 1942. Perhaps that's another wrong question, but I'm  
21 an oldtimer, I remember 1942. But there was some  
22 pretty serious terrain degradation because of that, is  
23 that not right?

24 A I don't know whether  
25 that's true or not, sir.

26 Q I'm wondering -- the  
27 reason I think it's significant what they did in Alyeska,  
28 is whether there are lessons to be learned by us all,  
29 and I haven't gone over it either but I have talked to  
30 a number of people that have.





1 On your question 14, you say  
2 if unfavourable climatic conditions were encountered  
3 in a particular year, would the haul period then have  
4 to be restricted and you said, I believe not entirely,  
5 and that you would use artificial snow, and I think I  
6 heard you yesterday saying you would make artificial  
7 snow as long as the temperature was below 32. Is that  
8 right?

9 A You could do that, yes sir.

10 Q Well I wonder if that's  
11 practical. Supposing you were to take a condition on a  
12 south or west facing slope and the temperature, the air  
13 temperature was 30 and the sun was shining, and you  
14 started making artificial snow, I wonder if that's a  
15 practical temperature in which to do it?

16 A No, I think that two  
17 ingredients have to be present to construct and or  
18 maintain a snow road. They are a supply of snow and  
19 also sustained or a sustaining period of cold weather.

20 Q Yes, but you're extending  
21 the life, and I assume you're extending it in the  
22 spring time, so I was wondering how you are going to --  
23 if your snow road is deteriorating because of the warm  
24 weather then how you are going to extend the life by  
25 making snow at that time when the temperatures are  
26 pretty close to 32 degrees, and with sun shining on it  
27 that you would get in April, I don't know how you make  
28 snow at that time.

29 A Sir, I was forced to  
30 agree that you could make snow with temperatures below



1 32 degrees. As to whether it's practical to try to  
2 maintain a snow road depends on the temperature. The  
3 accumulation of temperature below 32, and if you were  
4 hovering near that 32 degrees, I would say it is not  
5 practical to try to sustain the life of the road.

Q Do you not have to have  
about at least a zero degrees Fahrenheit to make snow?

MR. GENEST: You wouldn't be  
skiing in the south at all. I'm sorry, I'm adding my  
old experience.

MR. TEMPLETON:

Q Well I'm asking that as  
a serious question, despite Mr. Genest's technical  
opinion as a skier.

A I think not. I think if  
you have temperatures below 32 degrees Fahrenheit, it's  
possible to make snow with snowmaking equipment.

Q I can't help but make a  
little commercial in there in the last sentence of that  
thing, where you say your decisions -- the decision is  
essentially one of economics, which I have not analyzed,  
and I would suggest that in view of these hearings you  
should be considering the environment as well.

A The consideration of the  
environment is implicit in my terms of reference, sir.

Q Well I think sometimes we  
forget these things.

Would you think that it's --  
since the making of snow is probably a very important  
and necessary part of making -- of using these, getting



this amount of snow, is that right?

A Are you referring to the use of snowmaking equipment, sir?

Q Yes?

A I don't consider it to be an important consideration in the proposals that I put forward, except in the repair of spots in the road which have been worn out or in the construction of ice bridges.

Q Well, in the Canadian Arctic Gas test road at Inuvik, they had to use snowmaking -- not use snowmaking, but they had to import snow, right?

A Yes, sir.

Q So this is really a pretty real possibility of getting snow from somewhere, either harvesting it off a lake or making snow?

A That situation could occur, yes.

Q Would you consider it part of an environmental impact assessment to demonstrate ahead of time where the environmental effect of the removal of the snow as a harvest or as water from a water body?

A Yes.

Q In question 15, I think you said that you were counting to some degree on letting the ice bridges melt out. Is that in accordance with the land use regulations?

A My understanding is that



in certain instances, inspectors have required the bridges, the ice bridges to be ripped at road closure. I indicated that in my experience, I have not run across any problem related to ice bridges.

Q But fish migrate -- some fish migrate quite early, and if your ice bridge is there, and sometimes it has a lot of debris with it, it can stop a migration. I'm rather surprised that -- I think most ice bridges have to be taken out.

A I think I indicated that if there was any problem with the ice bridges, that ripping of the road surface or approaches could and will be undertaken at the time of road closure.

Q Now perhaps we could go to -- or just to leave that spot. I suppose this then becomes a term and condition of whether this should be allowed or not. You don't feel that you're going to set that imposition on yourself?

A No sir, I wouldn't do that.

Q Perhaps we could turn to these yellow sheets and just for the sake of one spot, I guess spreads 6, 7 and 8, would that include the area around Fort Simpson?

A Yes sir.

Q So that you would start preparing in October, with all terrain vehicles, is that right?

A It's indicated that that could occur in early November, perhaps as early as late October.





Q Yes, but that's only about  
a month from now --

A Yes.

Q -- and Simpson is the same  
climate, perhaps to some degree as Yellowknife --

A Yes.

Q -- so that you would have  
to use all terrain vehicles, is that right?

A Yes.

Q The ground isn't frozen  
enough at that time?

A Yes sir, that's right.

Q And when the actual construction would -- could take place, I'm talking about the pipeline construction now and perhaps this is Mr. Kosten, but I don't care who answers it, you say you are going to start the end of January, the last week of January I think.

WITNESS KOSTEN:

A Not on that section, and not on the southern portion. I believe it's around the middle of January.

Q I see, the middle of January?

A Thereabouts.

Q Section 1 and 2 is the end of January, is that right?

A Yes.



Q Okay.

Now I wondered. and you're going to end up, when would you finish in spread 6, 7 and 8. What time would you plan on stopping?

The Commissioner: A We require approximately 90 days in that section there.

Q You require 90 days of haul duration is that what you're saying?

A Ninety calendar days.

Q On 6, 7 and 8.

Mr. Templeton: A Thereabouts. yes.

Q That's the middle of April, isn't it?

A That is correct, sir.

Q Now, I wonder if you -- do you feel that you can maintain, under a reasonable degree of probability the snow road in that time?

A The probability according to Mr. Jarvis is there, yes

Q Perhaps we could go to that probability. Mr. Jarvis, and did you read Dr. Adams two reports on this on the probabilities?

WITNESS JARVIS.

A Yes, I have read those reports.

Q Do you accept -- I'm not clear on this table Y, the closure where you say the range of climatic criteria, the closure is ten days. above 32 degrees Fahrenheit or one inch of snow melt.

A Yes.



Q That,s one inch on the road?

1 A That's snow melt being  
2 defined as the total accumulated melt resulting from  
3 thaw or from rainfall.

4 Q Is that the same  
5 definition that Adam is using except that he says it  
6 should be half an inch?

7 A I believe it may be the  
8 same definition, yes sir.

9 Q Well he said, and I'm  
10 sorry, I don't have an extra copy for you, but he said  
11 shut down shall occur on the day when the thaw reaches  
12 .001 inches, that's for one day or more, and continuing  
13 to .5 inches of accumulated thaw on consecutive days.

14 A That's what he says.

15 Q Well -- and I gather that  
16 you would change that to say it's one inch instead of  
17 a half an inch?

18 A Well sir, I think that  
19 closure criteria that I've given is a double barreled  
20 one. It either refers to degree days accumulation or to  
21 snow melt. And my findings are that in every instance,  
22 the degree days has governed.

23 Q Well what do you mean in  
24 every instance. What are you --

25 A In every estimation of  
26 closure date, the governing criteria has been degree  
27 day accumulation. In other words that gives the  
28 earliest date of closure, so that the snow melt criteria,  
29 although I have examined them. do not determine these  
30 dates that are given on the charts



1 Q So you're saying that  
2 your -- I'm not sure, what do you mean ten days and on  
3 the other column you say 50 degree days above 32.

4 A Those are the ranges  
5 -- the possible ranges that various observers have given  
6 for -- and related those to date of closure of road.

7 Q As many as 50 degree  
8 days above 32 degrees?

9 A Yes sir.

10 Q Could you give me a  
11 citation for that. Who says that?

12 A At the moment I don't know  
13 the source of that data, I'm sorry, I can't.

14 Q Have you read that biblio-  
15 graphy of snow road construction that the Environment  
16 Protection Board put out as a addendum to Interim Report  
17 Number 3.

18 A Yes sir.

19 Q This was a compilation  
20 by the Arctic Institute of all published data on snow  
21 roads.

22 Adams job was to  
23 take that, compile it and come up with a report on  
24 the criteria and then check it with as many people as he  
25 could, and I think in that report, he goes through the  
26 conversations even that he had with people like Sig-  
27 fordson's for example in Manitoba and others, and he  
28 came up with this start up and shut down criteria and  
29 perhaps he's wrong, I'm not saying you should agree with  
30 him, but I think having done this rather substantial





1 amount of work, it would require a pretty considered  
2 answer if you disagree with it or if you think it's  
3 four times what he thought. I think he has checked it  
4 too with the land use people, and I think the land use  
5 people in the Mackenzie Valley, do make the decision  
6 as to when it will be shut down, and it's a subjective  
7 decision so that it isn't according to a mathematical  
8 computation. But for your purpose, you got to figure  
9 out your operation on some kind of a criteria so that  
10 you can predict how much you're going to do in a spread.

11 I think because it's so important I'm rather sur-  
12 prised perhaps that this wasn't, that this wasn't either  
13 contradicted or shown why you disagree, because my  
14 understanding for example, during say the Norman Wells  
15 test road, the land use inspector whose job it is to  
16 shut down snow roads, was there every day during this  
17 period and matters were measured and he said this is  
18 the day that I shut down and then the criteria were  
19 worked back along with all the others to try and work  
20 out this criteria. I don't know whether you'd agree  
21 with this. I don't think you necessarily should, but  
22 I do think that because this matter of snow roads is  
23 so important, I find it a little difficult to say  
24 well I might go four times as much as he does and let it  
25 go at that.

26 A Well I think Dr.

27 Adam and I had the common problem there and that is  
28 if you discuss the matter with people who are building and  
29 using snow roads they certainly are not going to quantify  
30 when they shut the road down in terms of degree days and



1 one must make a judgement in your discussion as to what  
2 sort of degree day condition they're discussing and I  
3 go back to my own input into that and that is that I  
4 made my own personal judgment based on my experience.  
5 I feel that these are reasonable criteria.

6 Q I see you have gone through  
7 all the data on that bibliography of winter roads,  
8 and made your own decision based on that?

9 A That is correct sir,  
10 yes.

11 Q Well take the example of  
12 Adams, and I assume that you've gone over it because  
13 you differ from it, very substantially, and take the  
14 example that he had, where he showed -- I guess this is  
15 unfair to do because you haven't got it in front of  
16 you, --

17 A Well sir, can I --

18 THE COMMISSIONER: Well, Miss  
19 Hutchinson has the exhibit. What volume are you looking  
20 for?

21 MR. TEMPLETON: It's this  
22 big black one.

23 135.

24 Q On page 33, figure five,  
25 if you go through Fort Simpson, which is the example  
26 we're using, I think you'd read off perhaps 75, the  
27 duration of winter roads -- sorry, this is for an  
28 example that Adam worked out, for a number of places in  
29 the Mackenzie Valley based on starting in January the  
30 1st and continuing to spring break up. And he worked out



1 the probability, and say an 80 percent probability  
2 would give you around 75 calendar days between when you  
3 start -- or between the January 1st and the spring  
4 break up, is that right?

5 A That's what the figure  
6 indicates, yes sir.

7 Q Yes sir, I'm not  
8 asking you to agree with it. Then you're going to  
9 start on the 15th, I think Mr. Kosten says, of January  
10 and so we should reduce that by 15, so we're down to  
11 now 60 days of working time.

A. By which?

12 Q He said he wasn't going to  
13 start until January 15 and Adam started on January 1st.

14 A Okay

15 Q And then do you agree  
16 with figure four, that Adam used on days when the unseasonal  
17 thaws I think he calls it, on figure four; and so that  
18 there are a few of these and according to that chart,  
19 there might be as many as perhaps six, if you're talking  
20 about an 80 percent probability.

21 A To the extent that I  
22 would agree with any envelope curve.

23 Q Yes, right. So if he's  
24 right, he's down to now 54 days and then I think Mr.  
25 Kosten said and perhaps I am not interpreting it right,  
26 so you can correct me Mr. Kosten, is that you allowed  
27 a 20 percent for periods when it was too cold to work.

28 WITNESS KOSTEN.

29 A The correct interpre-  
30 tation of that, Mr. Templeton is what we normally call  
down days and it is cold or whatever the reason.



1 Q Well okay.

2 A The figure is 25 percent.

3 Q 25 percent? Well that  
4 is -- we will say 10 days down time, so you are down to  
5 44 days, using Adams' figures, and can you --

6 A Well the 10 days refers  
7 to the total time that you're working with, sir.  
8 If you had 50 days, the percentage refers to the time  
9 of the period of time that you are dealing with.

10 Q It's a percentage of --

11 A Calendar time.

12 Q Yes, but of the days from  
13 when you start to when you finish?

14 A That's correct.

15 Q Does that include thaws  
16 unseasonal thaws?

17 A I hadn't considered it  
18 but it is possible.

19 Q Well then it might be any-  
20 where from 42 to 48 days. Can you build the spread,  
21 can that spread do it in that time? Supposing Adam's  
22 figures were right --

23 A I beg your pardon?

24 Q You required 60 days for  
25 that, didn't you?

26 A I required 90 days, sir.

27 Q Well you see, if his  
28 figures are right, you can't do it.

29 A That would be your  
30 implication, yes sir.







1 I might point out, sir, that  
2 say with reference to spread 8, we have -- I have had  
3 occasion to work in the area, the northwest corner of  
4 Alberta in that area on an actual construction project,  
5 and we were able to carry on work until approximately  
6 the 15th of April. This is on the Peace River job, the  
7 Peace River oil pipeline, the northern most end of it  
8 we were the contractor on it.

9 Q Well I don't dispute that  
10 there are, but I think we are talking about the future  
11 and we are talking about the probabilities of this  
12 happening, and I am trying to get to the conclusion  
13 because I have seen, and I'm sure you have, many, many  
14 operations that got caught in the spring and the result  
15 is terrain degradation that is completely unacceptable.

16 That's the purpose of my harangue, if that's the  
17 right word, is that how are we going to prevent that.  
18 I think if you know all of the conditions, perhaps you  
19 are not going to have as many chances of this condition  
20 occurring. Also I think it's pretty important that  
21 everybody understands the criteria under which they are  
22 going to be shut down, and that somewhere along the line  
23 we are going to say we don't care whether you finished  
24 your spread or not. The terrain degradation is going  
25 to become so great if you go beyond that you just can't  
26 go. This has serious implications to you, and I can  
27 imagine the sort of fight that's going to go on between  
28 the government inspectors and your operation, if you're  
29 only half done or two-thirds done.

So I think it's an extremely



important item, the winter roads. It's a key to your whole operation and it's a key to whether there's going to be unnecessary degradation.

Well can we expect from Mr. Jarvis, his report or some kind of challenge of Dr. Adams' report, because the two are completely different.

WITNESS JARVIS:

A Sir, I could say the suggestion you are making is that there is an order of magnitude difference in criteria, and I suggest to you --

Q No, not in order of magnitude. It's only four, eh?

A That's right, and if you look at the climatic data which I provided to Dr. Adams as part of his investigations for E.P.B., you will see that there is only a matter of a few days' difference between 10 degree days and 50 degree days.

Now, beyond that point it becomes a question of judgment, and so with all respect to Dr. Adam, and I know him quite well, he has never had the practical problem of constructing and maintaining a winter road, and I have.

Q I think he did. Did he not design and supervise the test loop at Norman Wells?

A Test loop, yes, but a production situation I am talking about, sir.

Q So I gather what you are saying is that you say from your experience that you can dispute that because he hasn't done what you have



done?

A No sir, I am saying that I am quite comfortable in my -- in establishing my criteria, on the basis of that experience.

Q I see.

A We have here what's commonly called the disagreement amongst the experts.

Q Oh yes, and there is nothing wrong with that, but I think it is, when somebody has done a fairly extensive study and you dispute it. I honestly think you should do more than just come and say "My experience is really better than his", however I guess I will have to let that go at that. I think -- well, I will let it go at that, but it will no doubt come up under Environment, and possibly when Dr. Adam is cross-examined it may come up again, and from all this we may come out with a better idea of where we are going.

A Yes sir.

Q Mr. Mirosh, you're considering the pipeline as a regulated utility, I imagine, is that right?

WITNESS MIROSH:

A Yes, it would be regulated.

Q This hearing is part of that regulation, is that correct?

A I imagine there would be some regulations coming out of this hearing, yes.

Q Well I think the terms and conditions that is in the Commissioner's terms of



1 reference is that, isn't it?

2 A Yes.

3 Q Is it usual in a regulated  
4 company to prove its case, for the utility to prove its  
5 case when it comes before a regulated body, or does it  
6 go before the regulated body and say what it wants to  
7 do, and it's up to the regulated body to do its own  
8 recommendations and decide whether the request should be  
9 granted?

10 MR. HOLLINGWORTH: Isn't this  
11 a matter of law, Mr. Commissioner? Aren't we asking  
12 to witness who <sup>is</sup> expert on construction matters relating  
13 to regulatory procedures, and really what amounts to  
14 questions of law?

15 THE COMMISSIONER: Well I think  
16 the objection is probably sound but we have always  
17 bent the rules a bit for Mr. Templeton, and he may be  
18 coming to something.

19 MR. HOLLINGWORTH: Well I have  
20 kept my peace up to this time because I recognized Mr.  
21 Templeton is in a unique position, but I am getting a  
22 little concerned --

23 THE COMMISSIONER: Well where  
24 is this getting us, Mr. Templeton? You have raised an  
25 important point but I don't know whether it is for Mr.  
26 Jarvis to answer it.

27 MR. TEMPLETON: It was Mr.  
28 Mirosh, because he's an officer -- well he's with the  
29 company and Mr. Jarvis is a consultant, that's why it  
30 was done to him. I think the burden of the proof as the





applicant, does he have the burden of proof to demonstrate what he is going to do and what are the environmental and social implications.

THE COMMISSIONER: Well now that's a very important point, the whole question has gone through my mind on a number of occasions, and I had intended at some stage to raise it with counsel, including of course yourself, and to ask counsel to consider whether at any stage they wanted to make representations, to me, about the burden of proof that might lie upon Arctic Gas and Foothills in this inquiry.

It is an important question, but Mr. Mirosh, despite his qualifications and they are many, isn't someone to whom I was looking for guidance on that matter.

MR. HOLLINGWORTH: That's my point.

MR. TEMPLETON: Yes, well --

THE COMMISSIONER: I was looking to you, if I may say, among others.

MR. TEMPLETON: I think I will leave that, because I brought it up with Canadian Arctic Gas too, but it's important in -- I think it is important for the applicants to know what their terms are, because I do get a feeling in some instances that they don't, to me, and I recognize that I am biased, but it doesn't appear to me that these exhibits are being prepared with the idea that you have to prove it, or you are liable to get your application turned down. I keep coming to them all the time, and I have this great



concern, and so I keep stumbling around in it and I recognize that I am perhaps just muddying the water, but I can't help but get this impression when I read these exhibits. So I will -- sorry, go ahead.

MR. HOLLINGWORTH: I don't think Mr. Templeton is muddying the water at all, but respectfully sir, I think it's a risk that the applicants are running when they put forward their application, and it's up to you to decide, on the basis of argument that's put to you at a later stage, as to whether you feel it is applicable, and I don't see what the constant exchange with the panel is going to accomplish from this.

THE COMMISSIONER: I agree with you, Mr. Hollingworth, but I always choose the path of least resistance, and that's why I was letting Mr. Templeton go on. I wish counsel would give some thought to this matter that Mr. Templeton has raised, that is at the end of the day, counsel will want to argue what terms and conditions I ought to recommend to the Minister and his colleagues to be imposed, if this pipeline were to be built, and whether a particular term or condition is necessary may well depend upon the state of the evidence, and counsel may wish then to urge that the burden of proof lies on Arctic Gas and Foothills, or that it does not.



1 And that it is for those who  
2 challenge their case, to show that a particular term or  
3 condition is required, because Arctic Gas and Foothills  
4 have not met an appropriate burden of proof. Well think  
5 about it anyway and the matter may turn out to be one  
6 of some importance later on in the inquiry. So I  
7 appreciate your bringing it up again

8 MR TEMPLETON: That's all  
9 the questions I have.

10 CROSS-EXAMINATION BY MR. BELL:

11 Q I'd like to discuss with  
12 you this morning some of the aspects of scheduling.  
13 I'm going to be referring to the bar chart, at page 3DL7  
14 part 3. I see that according to this chart, from the  
15 very first activities on the pipeline, pre- construction  
16 activities to the very last. which would be the full  
17 powering of nine stations is approximately eight years.  
18 What I would like to discuss with you is the possibility  
19 of shortening and expanding that period. I think that  
20 this is a matter which may arise in the later phases  
21 of the inquiry. and it might be useful to have the  
22 opinion of the experts on construction as to just what  
23 is feasible and what isn't and what the implications of  
24 doing this are. Perhaps we could concentrate first  
25 on compressing this period. I would like to know if  
26 it's possible to shorten this period and if so by how  
27 much and what the implications of doing that are. Perhaps  
28 Mr. Mirosh, if I could just take you through the  
29 categories that appear on the left hand side of this  
30 chart, and ask you if it is possible to shorten them, and



1 what the implications of doing that would be. Perhaps  
2 we can start with pre-construction activities. Is it,  
3 I see that takes approximately two years, slightly more  
4 than two years. Is it possible to reduce that  
5 period of time?

6 A No sir we're well into  
7 that period already and I don't think it would be  
8 reasonable to shorten that period.

9 Q And the survey, that is  
10 on going throughout the rest of the activities, do I  
11 understand that to be the case from this chart?

12 The survey is the next item  
13 on the --

14 A Yes, it does continue  
15 through to, in various stages, through to 1979

16 Q Well would it help us  
17 at all in the end to try and shorten the survey?  
18 The period over which it takes place?

19 A I think if you're asking  
20 the question of how could this time period be compressed,  
21 the only logical possibility would be to add more com-  
22 pressor stations at an earlier period of time. But  
23 to do that one would have to be aware of a need for  
24 more gas at an earlier period of time than we've been  
25 projecting.

26 Q Yes, well the question of  
27 demand and supply of gas is one which is not before this  
28 inquiry and I think I'd like to ask you to assume that  
29 the demand would be there at an earlier date, for the  
30 purpose of this question, and do I understand from what







1 you're telling me then that the only area where you can  
2 really be flexible on this schedule would be in com-  
3 pressor station construction?

4 A Yes sir.

5 Q How flexible can you  
6 be. Could you complete full powering by 1980 say in-  
7 stead of 1982?

8 A I think that could be  
9 possible. It would change the manpower requirements  
10 and --

11 Q Well that's something  
12 I'd like to know about too. What would it mean for  
13 manpower requirements?

14 A Well I think we'd have  
15 to assess that and come back to you with an answer. It  
16 would mean of course that where we are talking of  
17 only building two full and four partial stations, during  
18 the significant construction periods, that we would  
19 have to be building seventeen or some portion of that  
20 stations on the same period of time. It would put  
21 a strain on logistics and supply of station materials  
22 which would have to be investigated.

23 Q You would anticipate  
24 though that it could be possible to get enough men and  
25 enough equipment to overcome logistics problems to  
26 actually do the construction?

27 A Well --

28 Q It s not totally out  
29 of the question?

30 A It could be possible, we've



1 been concerned with obtaining this kind of equipment  
2 from Canadian manufacturers and we'd have to look at it  
3 from that point of view. If we remove that constraint,  
4 I'm sure on the world market, the equipment would be  
5 available.

6 Q And in terms of the  
7 cost of equipment, and the cost of labour I assume  
8 that what would happen is that the increased urgency of  
9 demand would probably result in higher costs for those  
10 requirements.

11 A Well it may, on the  
12 other hand there would be a reduced cost of interest  
13 which may offset that somewhat.

14 Q The financial requirements  
15 that's another element that I'm interested in, and  
16 what you're saying then, as I understand it, is that  
17 although the amount of money you would have to borrow  
18 would increase, the length of time over which you would  
19 be paying interest would decrease.

20 A Yes.

21 Q There would be some offset  
22 there.

23 A Escalation would tend to  
24 offset that somewhat.

25 Q And while I've got this  
26 term in front of me, did I understand you to say that  
27 spread eight would be constructed in the first winter  
28 of construction?

29 WITNESS KOSTEN:

30 A That is the way it is



1 presently scheduled, yes.

2 Q Can you show me that on  
3 this chart, does it appear here?

4 A I don't believe so.

5 Q So we have to add in that  
6 particular portion, to make the chart complete.

7 WITNESS MIROSH.

8 A Well I think this parti-  
9 cular schedule shows construction during '78 and '79 for  
10 pipeline, and unless I'm incorrect, spread eight is  
11 implicit in the 19 - in 1978 outline.

12 Q So for 1978 you would have  
13 eight spreads operating?

14 A That is correct.

15 Q In 1979 only seven?

16 A That is correct.

17 Q I see. If we could look  
18 at the schedule from the other point of view, and see  
19 how long it could be stretched out, perhaps I could start  
20 this line of questioning off by asking you if the pipeline  
21 could be built by using only one construction spread.

22 A I don't think that's  
23 practical.

24 Q Why is that?

25 A On the schedule that we  
26 have set up, it would take 15 construction seasons.

27 Q And why does that make it  
28 not practical. It would just take 15 seasons and --

29 A Well you wouldn't have  
30 a continuous pipeline until the 15th season was finished.



1 Q Yes, I understand that,  
2 well suppose you used two spreads then.

3 A It would be seven years  
4 then.

5 I think if you're asking us  
6 how long we might extend it, I suppose that one  
7 possibility would be three construction years rather than  
8 two. If, for some reason it became an overriding require-  
9 ment to spread out the construction as opposed to bringing  
10 the gas south. Beyond that I'm not sure if it would  
11 be practical and we'd have to look at this .

12 Q Well one of the things  
13 I'm concerned about is the fact that you have to pay  
14 incentives to the workers in order to -- well first of  
15 all to overcome the deterrent of isolation and difficult  
16 working conditions. But you also have to pay incentives  
17 in order to assure a constant supply of labour, is that  
18 correct?

19 WITNESS KOSTEN:

20 A The incentives that I  
21 referred to are already part of the agreements that have  
22 been negotiated between the parties for work in the  
23 Northwest Territories.

24 Q Right and I take it that  
25 the wages that you would be offering would be higher than  
26 is usual in the pipeline industry?

27 A No sir, we haven't based  
28 our costs on that. The costs were built up from the  
29 rates in the existing pipeline agreements.

30 In essence that was used. There





1 were negotiations going on at the time that we prepared  
2 the estimates, the agreements had expired and were  
3 being negotiated at that time and we estimated what the  
4 increases for the particular year were, but these have  
5 now been settled and we were within those rates.

6 Q Just so I understand this.  
7 The estimates for your wage bill are based on wages which  
8 are usually paid in the pipeline industry for construction  
9 in southern Canada and other parts of --

10 A No sir, these are rates  
11 that are in existence in existing agreements for the  
12 Northwest Territories. They are different than rates  
13 in other parts of the country but these are established  
14 by negotiation between the Pipeline Contractors  
15 Association, as agents for the contractors, and the unions.

16 The Commissioner: Q You mean these are rates  
17 based on the rates paid on the Pointed Mountain Construction  
18 Project? Or do you mean rates for the various trades  
19 in pipeline work north of 60?

20 A No sir. our pipeline  
21 construction was estimated on the rates that were  
22 applicable in the agreements for that period of time. In  
23 other words, 1975 prices.

24 Q Well there's no pipeline  
25 construction going on now north of 60 is there?

26 A Not to my knowledge  
27 no sir, but in the agreements, there are rates established  
28 for work in the Northwest Territories.

29 Q I see. And you're taking  
30 those rates and taking into account the length and work week



1 and working day that you anticipate adding the overtime  
2 and double time and so on, is that it?

3 A That is correct sir.  
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MR. BELL:

Q Well just so I can make my concern a little more explicit, we have seen a phenomenon in Alaska where large numbers of people without any prior contact with a pipeline company, have taken it on themselves to go up to Alaska to see if they can't get work on the pipeline, and the main attraction is the high wage rate for unskilled labour on that particular project. I'm concerned that we might be encountering the same phenomenon on this project.

I'm just wondering how we can -- whether it's possible, in your opinion, to reduce the attractiveness of -- to unskilled people to come up here on their own, by reducing the high level of wages.

A The wages that are established by the unions are obligatory in the sense that the unions will have jurisdiction over the project, and that the contractors by signature to agreements have agreed to comply to those rates.

We don't have the luxury of paying less, if you will, on a union project as this will be.

Q Suppose that you did, would it help us to do that? That's what I want to know.

A I'm not sure how I can answer this, Mr. Commissioner. You don't have the luxury of paying lower rates when you have a union jurisdiction over the contract.

Q Well maybe we could



persuade the unions to change their minds.

A I'm sure the contractors would be quite happy if you could negotiate lower rates with the unions.

Q Well the question that I am getting at is, does the urgency of your demands for labour have any effect on these rates?

A No sir.

THE COMMISSIONER: Excuse me, I don't quite understand that. Does the what, does the urgency -- does the demand -- what do you understand the witness to have just told you, let's put it that way?

MR. BELL: Well I understand that -- him to have told me that even if we were to spread the construction out over a longer period, which would require fewer men at any given time, that the wage rates would remain the same. Is that --

A That's correct.

When I sign a union agreement stating that these are the rates that I'm going to pay, I can't turn around and pay lower rates, sir.

MR. SCOTT: Mr. Commissioner, isn't Mr. Bell sort of at odds with the witness on this question, because what he's presumably concerned about is not the wage rates, but rather overtime. The wage package is substantially -- I shouldn't say substantially, but the wage package is in part the overtime package.

THE COMMISSIONER: What we





were told, Mr. Kosten, by a witness from Alaska was that the rates that are paid there, apparently conform to the rates that are paid for the various trades in the lower 48, but it is the 7 day work week and the 12 hour day and the 30 day month they work that drives those wages up, so that a chambermaid, for instance, in one of those camps gets 2200 a month take-home pay after taxes, and the people such as the front end welders are getting an awful lot more than that.

But Mr. Bell's point, if you were to lengthen the project or stretch it out, and not to have the 12 hour day and the 7 day week and so on, but to have these people work something approximating normal work weeks and normal shifts, you would presumably not have this terrific incentive to come up here from the south to make a lot of money.

Now, would that be an economic way to build a pipeline?

A This would assume that wage rates remain stable from one year to the -- or remain frozen, if you would, from the period of expiration of a contract.

THE COMMISSIONER: No, let's suppose wage rates went up, there's no doubt --

A This is the tendency, sir, this is --

THE COMMISSIONER: But you ameliorate the Alaska thing by not having all the double time -- by not having all the overtime and the double time, which is what apparently shoots the Alaska wage



1 rates right up through the roof. Is that possible, or  
-- if it's totally impractical, we might as well know.

A It is my understanding,  
sir, that the wage rates paid on the Alyeska project  
were negotiated specifically for that project. I don't  
foresee at this point in time, at least, I'm projecting  
into the future here, but I believe that we have a  
situation here where wage rates have been established  
for working in the area, that is the Northwest Terri-  
tories, under union agreements. The tendency of stretch-  
ing a project out normally what transpires is that you  
have increases in wage rates as your contract expires,  
because wages always go up, they never go down, so your  
wage rates in that context, I suspect would be higher  
as you push the project down the road.

Q Yes.

A It's an offsetting  
effect. At this point I couldn't predict what it would  
be.

THE COMMISSIONER: Well let  
me just ask you this.

A Your normal escalation  
comes into it.

THE COMMISSIONER: Let me  
pursue Mr. Bell's point, if I can. Mr. Bell represents  
the Indian Brotherhood, their concern of many things,  
one of them being the great influx of people from the  
south looking for jobs, and many of them presumably not  
getting them.

That's a concern of the



governments and of mine.

A Yes sir.

THE COMMISSIONER: But what about the point he is making, that if you said "Now look, we are not going to establish a situation where you get these terrific wages being earned on the pipeline as occurred in Alaska, and to avoid that, we have got a union agreement to live with, and the Pipeline Contractors' Association no doubt wants to live with it, so they say we will have these front end welders and the other trades working an eight hour day, five days a week and no overtime, no double time.

Now, is that just tantamount to say we are not going to build the pipeline?

A No sir.

THE COMMISSIONER: Mr. Bauer seemed to nod in agreement.

WITNESS BAUER:

A Well sir, I can only refer to my own experience on the Trans Alpine pipeline job in Europe, where there was a similar proposal as Mr. Bell is indicating or advocating was made by the authorities, and we gave it --

THE COMMISSIONER: Where was this again?

A The Trans Alpine Pipeline in Europe.

THE COMMISSIONER: Trans Alpine Pipeline in Europe. Where does that go to or come from?



A It goes from Trieste, from Italy to Ingolstadt, to Germany. It goes right through the Alps. It was for --

THE COMMISSIONER: It's for bringing Middle East oil to Europe?

A That is correct, sir. And there were also trial balloons, if I use that term, because everybody wanted to have his say-so, I would say it was a premature Alyeska job, if I use that term again, and the unions wanted their say; the authorities wanted their say, and the technical experts wanted their say; in other words, it became an intangible situation to live with.

MR. BELL: What about the lawyers?

A Well they were there too. So -- in other words, we went along at the beginning.

THE COMMISSIONER: You were working for the people building the Trans Alpine, were you?

A I was consulting, sir, I was actually the project director and it was my responsibility to hold hands with everybody, if I use that term. I was bilingual so I had to do it for both sides.

We tried it on a five days base, and the project became a monster because, in your own reference, sir, the top line welders they just left. They went to other projects because at that particular time there were various big projects going in Marseilles;





and the Middle East and so on, so they left, so what was left, we had a second hand, or a second row of qualifications which we were all afraid of, we cannot do it.

THE COMMISSIONER: A second class group of welders?

A That is correct.

THE COMMISSIONER: Unqualified?

A I shouldn't say unqualified, but not the top rate to guarantee good production.

THE COMMISSIONER: And that was because you had gone ahead, conforming to the wishes of all these interested groups, on a 5 day work week basis?

A That is correct, and it became so that the majority of contractors, practically told us, look either we change our philosophy

or they were put out, contract or no contract. In other words, it became that bad a situation, and we thought before the project turned sour we better change horses, and we did.

THE COMMISSIONER: So what did you do then?

A Well what we did, we just called everybody together and said now gentlemen, what do you want? Here we have a situation, the project is half-way through. Are we completing the project sensibly or are we going along with everybody's wishes? Then we have nothing, so it was decided after many meetings and whatever one may call, fruitless or useless or so, that yes, we go along, okay, in that particular



instance it was Bechtel Corporation whom I was representing. You are the experts in that field, now you show us a way out, and we did. But in my opinion, sir,

THE COMMISSIONER: Well what was the way out?

A The way out, to say now Look, okay we have all got to agree. As long as we go in different directions, we never get that project completed, because the costs will be just added to the consumer, and if that's what we want, then I think that's not the desirable effect, so that made a lot of people think too.

In the meantime, we had an added problem with land owners, because although there were already land act decisions made, they said "Hold it, we can cash in again. Maybe we should ask more for the land", so the problem became a compounded one, but my warning, sir, is that that should be avoided on this project. In other words, that everybody should say "Look, we realize in sound contracting, the fastest and the best way is to get in, do a good job and get out," for a contractor.

THE COMMISSIONER: So what did you do though about the hours of work of the top line welders?

A We gave them every hour they wanted to work, through the unions what they were asking was, thus we get that back the top line welders, they made their money or whoever was qualified in



related trades, and we got the job done.

THE COMMISSIONER: Well, you're saying, I take it, and we might as well know it so we don't spend a lot of time cooking up schemes that are not going to get anywhere, that you have to provide the kind of wages that the people who are needed from the south, from other parts of the world to build this thing, are getting in Alaska. You have to pay the kind of wages they are paying in Alaska to get them up here to the Mackenzie Valley?



1 A That is correct sir.

2 Q Or you won't have a pipeline

3 WITNESS KOSTEN:

4 A I'm sorry did you say  
5 the kind of wages they're paying in Alaska?

6 Q Yes.

7 A I would disagree with that  
8 sir.

9 WITNESS BAUER:

10 A May-be I misunderstood  
11 that sir. My answer would be, that you have to pay  
12 good or attractive wages in order to get the topline  
13 people.

14 Q Why would they be paying  
15 those wages in Alaska, \$2200 take home pay each month  
16 for a chambermaid, just taking an example we were  
17 given by a witness from Alaska, but why are they paying  
18 them in Alaska unless they are paying them because they  
19 have to to get the people to come and work. Isn't it  
20 supply and demand. Isn't that what is supposed to govern  
21 these things?

22 A To some degree yes sir,  
23 in  
24 but my own assessment, talking about the Alyeska project,  
25 that is a typical example when a project gets too bogged  
26 down by whatever regulatory bodies are involved, so that  
27 the actual construction is artificially delayed and then  
28 you have such inflation as far as wage scales and so  
29 on because of a lot of people turning around and then  
30 you always, whenever you replace people asking for more  
wages, and the unions they are in. naturally they ask for





1 more and more as they can get, or they don't provide the  
2 people.

WITNESS KOSTEN:

3 A That's right. Well I  
4 would point out sir that the wage rates prior to the  
5 start of this project in Alaska were considerably higher  
6 than they were in any of the other lower 48 states, and  
7 possibly the mushrooming effect of getting the job done  
8 has had an effect on the rates that have now been  
9 negotiated. These rates have all been established by  
10 union agreements.

11 Q But would you have to  
12 pay here, in the Northwest Territories and the Yukon  
13 the rates that have been negotiated in Alaska?

14 A I would hope not sir.

15 Q What do you think, Mr.  
16 Bauer?

WITNESS BAUER.

17 A I agree with Mr. Kosten.

18 Q You would hope not?

19 A Yes.

20 Q I'm not talking about  
21 hopes, ~~gain~~ or otherwise, what do you think would be  
22 likely to happen?

23 A Well sir, in my own  
24 assessment, the more the whole Mackenzie Pipeline  
25 question is delayed, in my own opinion, the worse it  
26 will get as far as salaries, as far as costs, in every  
27 aspect. It can only become more costly,  
28 not reduced.

29 Q You're saying the trend



1 by which wages and salaries and costs and everything  
2 else we have seen these things going up, you say they're  
3 going to continue to go up?

4 A Yes sir.

5 Q Well I don't think there's  
6 anyone in this room that would dispute that. I suppose  
7 that the value of the gas in the delta and the Beaufort  
8 Sea will continue to go up too.

9 Well, let's recess this  
10 very interesting discussion and maybe I'll let you  
11 say something after coffee, Mr. Bell

12 (PROCEEDINGS ADJOURNED)  
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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. BELL:

Q Well before I continue I should clear up just one thing that Mr. Bauer said. He suggested that I was advocating this as a scheme. I should point out that I'm not doing that, I'm trying to find out what the facts are. It may turn out that it would be better to just complete this project in as short a period as possible, and get it over with instead of lengthening it.

MR. HOLLINGWORTH: I'm sorry. What was Mr. Bauer attributed as saying?

MR. BELL: Well I believe he suggested that I was advocating my suggestion, and it was just a suggestion.

THE COMMISSIONER: Just so that you understand this. We have visited many of the towns and villages in this valley, and the Chamber of Commerce has urged the project be stretched out, so that small businessmen will have a greater opportunity to participate as sub-contractors and so on.

The -- some others have said there should be wages and price controls, certainly wage controls imposed on the pipeline, and if it is built, so Mr. Bell is just exploring some of these ideas with you and not urging any of them, as I understand it.

MR. BELL:

Q I'm just wondering if we



could explore a little further, the consequences of stretching out the construction schedule, and I would like to ask you what would be the implications on your materials and equipment requirements if you were to extend the schedule?

WITNESS MIROSH:

A Well it would obviously, or perhaps not so obviously, but it would be easier for us to procure equipment having a longer lead time. There would be less stress on expediting equipment and there would be an impact on the logistics means if we were to stretch the project out. There would be less of a requirement for the logistics component.

Q Well in the application you show the annual tonnages that you expect to require?

A Yes.

Q And there's a rather large rise in the second and third years, I believe?

A Yes, the second year I think is a peak.

Q Well how -- is it possible to flatten that peak out? Is it --

A Yes, if --

Q -- and by how much?

A Well if we took your premise that we wanted to stretch the pipeline construction out to three years from two, I believe currently the second year tonnage is something like 450,000 tons total. A great deal of that is pipe. I think perhaps





about -- or more than half of that I believe is pipe. That would be reduced down to one-third of the total pipe requirements, rather than one-half of the pipe requirement. I would have to --

Q There would still be a fairly substantial peak though, wouldn't it? It would be a noticeable increase?

A Oh, I think it would be noticeable. We would have to do some calculations but it would reduce the barge requirements to some degree.

Q And the implications for cost, would that be favourable to you then?

A Well there would be both positive or negative aspects to costs, extending the project would have the tendency to increase costs in terms of escalation. There would be a tendency to decrease costs due to such things as perhaps less barges. It would be -- it would be hard to judge until one set up a debit and credit calculation.

Q And we discussed the financial aspect of it when we were talking about compressing the time period. I assume the same sort of considerations would apply if we were to extend the time period, that is you would be borrowing less money at any given time, but the length of time over which you would have to pay interest would increase?

A Yes.

Q And of course the day on which revenues would start to come in would be delayed?

A Yes. If we took your



1 example of extending the pipeline construction from two  
2 to three years, then there would be a year delay in  
3 revenue.  
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1 Q If I could just get back  
2 to one question that I forgot to ask you on the labour  
3 situation. If the project were extended to three years,  
4 would that mean there would be fewer people in the  
5 field at any given time, that the peaks in that  
6 particular table would be flattened out?

7 A Yes, we'd probably end  
8 up with fewer spreads but working the same hours as we've  
9 outlined.

10 MR. BELL: I think that that  
11 pretty well completes my questions on that particular  
12 aspect of the application. I have one further question,  
13 on a minor matter. Mr. Kosten, at page 21 of the prepared  
14 testimony, you talk about blasting techniques and  
15 you say that further tests are going to be required.  
16 I was wondering if you could tell me when these tests  
17 will be carried out?

18 WITNESS KOSTEN:

19 A I can't say for certain.  
20 I have recommended to Foothills that they carry out  
21 such tests prior to construction. but that would be  
22 presumably either this winter or the next.

23 Q Are there any plans for  
24 these tests Mr. Mirosh?

25 WITNESS MIROSH:

26 A Well they have a proposal  
27 which we've looked at for carrying out these tests. We  
28 haven't made final plans as to whether they will be  
29 carried out this winter or next.

30 Q So you wouldn't know where



1 they would be carried out?

2 A Well they would be  
3 carried out in the North. We would apply for a permit  
4 to carry out these tests in an area that we would  
5 select to be representative of areas that we would  
6 propose blasing.

7 MR. BELL: That completes my  
8 cross-examination sir.

9 THE COMMISSIONER: Thank you  
10 Mr. Bell.

11 CROSS-EXAMINATION BY MR. SCOTT:

12 Q Gentlemen, I don't intend  
13 to get into the labour questions now as I propose to  
14 reserve most of those for phase IV but I would just  
15 like to ask a number of questions of Mr. Kosten about them.  
16 First of all, I take it that calculating the number of  
17 employees and the wages that they will be paid is an  
18 important responsibility in costing the project.

19 Witness Kosten: A Yes sir.

20 Q And I take it that some  
21 work has been done on that?

22 A Yes sir.

23 Q What is the proportion  
24 that -- what is the proportion between overtime payment  
25 and straight time payment?

26 A The normal straight  
27 time that applies in all the agreements is 40 hours  
28 per week of straight time and the balance -- that is  
29 if you're on a ten hour day, you'd have 70 hours, 40  
30 of those hours are paid at straight time. the balance.





1 being 30 are paid at time and a half.

2 Q So would it be fair to  
3 say that the proportion of overtime to straight time  
4 is a little less than one to one?

5 A That is correct.

6 Q Yes. And I take it that  
7 overtime is paid depending on the volume of hours either  
8 at time and a half or at double time?

9 A You only pay double time  
10 under the agreements, on statutory holidays

11 Q Yes. So that a substantial  
12 proportion perhaps approaching two thirds of your wage  
13 payments will be overtime payments?

14 A Yes sir.

15 Q Now, we talked earlier  
16 about the persons who will be working on this pipeline.

17 I take it first of all, that there are a group of  
18 highly skilled people such as welders that you will  
19 draw from wherever they are available. In North America  
20 you may not have to go to Texas, but you'll certainly  
21 have to go to southern and eastern Canada and the  
22 eastern United States and western United States.

23 A I wouldn't anticipate,  
24 there might be some of that, I would anticipate, but  
25 through welding training programs, most of the requirement  
26 for the project would be drawn from within Canada. This  
27 depends on other activities such as gas plants, large  
28 projects and whatever activities are going on concurrently  
29 and of course, other pipeline projects.

Q Well perhaps it's obvious



1 from your earlier answers, that -- I take it that in  
2 order to attract these people, whether they're trained in  
3 Canada or elsewhere, you have to provide them through  
4 the promise of overtime, with a substantial monthly  
5 income?

6 A The incentive is the  
7 number of hours they work basically.

8 Q That core personnel  
9 basically will not come to the North to work a 40 hour  
10 week?

11 A No sir.

12 Q Well now I take it that  
13 apart from that core of highly skilled employees, there  
14 are two other categories, first of all the totally  
15 unskilled and I'm thinking of those who clear the  
16 right-of-way and perhaps truck drivers and so on. that  
17 would be one category, wouldn't it?

18 A Yes sir.

19 Q And a second category  
20 that is persons who commence on the job as relatively  
21 unskilled but who, in the course of their work, develop  
22 skills so that after they've been on the project for  
23 awhile are capable of doing more sophisticated work.

24 A We anticipate there would  
25 be this factor, yes.

26 Q I take it that those two  
27 groups, are substantially larger than what we call the  
28 core of highly skilled people?

29 A I'm sorry, I'm not sure  
30 I follow you, Mr. Scott.



1 Q You told us about the core  
2 of highly skilled people that you must attract, from  
3 whatever place, who will require larger earnings through  
4 the promise of overtime. I take it that there are two  
5 other groups that are not in that category but which are  
6 either unskilled or who become skilled or semi-skilled who  
7 are much more easily available?

8 A I wouldn't say that they're  
9 much more easily available, that's a term I have  
10 difficulty with here Mr Scott.

11 Q Well let me put it this way,  
12 a great deal of work has to be done in the terms of  
13 preparing erosion control devices and installing them  
14 and so forth. Now I take it much of that work will be  
15 supervised by a highly skilled person, or an environ-  
16 mentalist but will in fact be done by people who were  
17 semi-skilled or even unskilled under this direction?

18 A I am answering primarily  
19 to the pipeline portion of this sir. I was not involved  
20 in the development of the costs for the other portions  
21 of the project.

22 Q Would you agree with me  
23 that in numbers and speaking only generally at this  
24 stage and in this phase, unskilled and semi-skilled  
25 people will vastly outnumber the hard core of highly  
26 skilled persons such as welders et cetera.

27 A I think that's a fair  
28 assessment.

29 Q And I take it that if  
30 you look at the press reports about Alyeska, the in mig-  
rants



1 to Alaska have not substantially been migrants who  
2 want to work as welders and are waiting around looking  
3 for work.

4 A That is correct.

5 Q They appear to be un-  
6 skilled or semi skilled persons who are seeking either  
7 labouring work or work where the skills are marginal.

8 A I'm not intimately familiar  
9 but I understand that this is the case, yes.

10 Q That would be typical  
11 for a large project wouldn't it?

12 A Yes sir.

13 Q And I take it that the  
14 reason they migrate for this kind of work is not so  
15 much because of the wage rates but is because of the  
16 expectation, warranted or not, that there will be  
17 substantial overtime?

18 A Your wage rates are  
19 quite substantially above the normal rates on a pipeline  
20 project in Alaska regardless of overtime sir.

21 Q But adding in overtime,  
22 the factor is enormous?

23 A It can get away on your, yes.

24 Q And that's why you have  
25 a housekeeper in a bunk house who can earn \$2200 for  
26 example a month?

27 A I'm not sure that this is  
28 due to overtime. I wouldn't be prepared to agree with  
29 that?

30 Q Well let me put this





1 proposition to you. You have --

2 THE COMMISSIONER: These were  
3 the T-4 slips.

4 MR SCOTT:

5 Q You have your hard core  
6 highly skilled people to whom you must promise as much  
7 work as possible to attract. I suggest to you that  
8 for the others, the unskilled and the semi-skilled, you  
9 can reduce the amount of overtime for each one of them  
10 by hiring more of that category of employee.

11 A It doesn't work that way  
12 sir.

13 Q Why not?

14 A Let me give you  
15 an example that if you have a crew let me select one,  
16 let's say the tie in crew, this is a crew that comes along  
17 behind the coating crew and joins the pipe together into  
18 a continuous line. You have the various categories of  
19 people that are involved in that crew and I pick that one  
20 because you have the -- all four crafts represented  
21 on that crew and they will all get whatever -- let's  
22 say you have several welders on that crew, you will have  
23 truck drivers, you will have operators, and you will  
24 have labourers and whatever hours that crew works, all  
25 of those crafts on that crew get paid the same number  
26 of hours. There is no differentiation if you wish  
27 between the number of hours that a labourer works or  
28 a truck driver or a semi-skilled labourer or a truck  
29 driver, they all get the same number of hours on that  
30 crew.



1 Q I understand that's in  
2 fact how it works and that in fact is how semi-skilled  
3 persons earn very 'large amounts of money. But isn't it  
4 possible, leaving aside the core of skilled people, to  
5 erect a scheme in which there can be swing shifts and  
6 so on for the unskilled, or the semi-skilled. thereby  
7 reducing the amount of overtime that those categories  
8 earn?

9 A I suppose it's theoretically  
10 possible. It doesn't work that way though.

11 Q Well would you agree with  
12 me that in a large project of this type for economic  
13 reasons, it's never really been tried?

14 A It has been in this  
15 specific, we haven't considered it.

16 Q No.

17 A Various schemes have been  
18 tried and you always get back to the standard way of  
19 doing it sir.

20 Q Well can you give me an  
21 example so I can investigate it, of a scheme, a large  
22 project, where an effort has been made to allow the  
23 skilled workers, the highly skilled workers, to earn  
24 maximum earnings through accumulation of overtime. and  
25 swing or other shifts have been developed so that the  
26 unskilled and semi-skilled persons work more regular  
27 hours? Do you know of any such project where that's  
28 been attempted?

29 A Your Hydro dam projects  
30 operate on a two shift basis. I'm not a dam builder



1 I don't know how this works. I understand they do it  
2 this way. It's a different situation. These are  
3 three year projects, you know two or three year projects.  
4 On a pipeline project it normally doesn't accomplish  
5 anything. and that adds to the cost.

6 Q Are you aware of any  
7 pipeline project where it's been attempted? I know it  
8 adds to the cost?

9 A I can't site one, no sir.

10 Q Let me just get on to  
11 something else and I want to be sure I understand the  
12 scheme. Let's look at the whole Foothills project and  
13 I take it the first winter is going to be devoted to  
14 clearing?

15 A That is correct.

16 Q The second winter is  
17 devoted to building half of the mainline?

18 A That is correct

19 Q The third winter is  
20 devoted to building the other half of the mainline?

21 A That is correct.

22 Q Now one of the spreads  
23 is stipulated to be a summer spread When is that --

24 A No sir, it is not.

25 Q Isn't spread six going to  
26 be a summer spread?

27 A It's being considered.  
28 It's presently scheduled to be a winter project.

29 Q Well it's being considered  
30 as a summer spread, is it?



1 A That's about as far as  
2 it's gone sir.

3 Q Well that's what the  
4 application says, doesn't it?

5 A I don't believe so.

6 WITNESS MIROSH.

7 A No, everything that we've  
8 put forward is based on winter construction but we have  
9 had the suggestion that we should consider a summer  
10 spread and we haven't really finalized our thoughts on  
11 that.

12 Q All right, now if you have  
13 a summer spread I presume it will probably be spread six?





1 Witness Kosten:

A This is a possibility.

2 Q When with relation to the  
3 winter spreads, would it be built? Between them, before  
4 them or after them?

5 A We haven't finalized on  
6 that, sir.

7 Q Okay.

8 A Presumably I might offer  
9 that it might be in between.

10 Q Well now, I take it that  
11 when the -- looking at your bar charts, that when the  
12 second winter has been completed and the main line has  
13 been completed, you will then go into a three season or  
14 a three winter season of building the -- and activating  
15 the compressors?

16 A Yes.

17 Q And I take it that you  
18 will devote two winter seasons to building, as an  
19 example, the Yellowknife and Pine Point lateral?

20 WITNESS MIROSH:  
A Yes.

21 Q So Yellowknife and Pine  
22 Point will be built in winters 4 and 5?

23 A That's correct.

24 Q When is the Yellowknife-  
25 Pine Point lateral going to be cleared?

26 WITNESS KOSTEN:

27 A I anticipate it would be  
28 concurrent with the construction.

29 Q So at least for that  
30 lateral you are going to adopt the model that Arctic



1 Gas has put forward, of clearing immediately before  
2 construction?

3 A This is the intent, yes.

4 Q Yes, and what right-of-way  
5 and working surface do you require for that lateral?

6 WITNESS MIROSH:

7 A Well where we require snow  
8 roads, we propose to utilize them as well.

9 Q Well perhaps you can just  
10 summarize for me what the application says, because I  
11 don't have the point at hand. Are you looking for 120  
12 feet on the service laterals?

13 A We wouldn't require that  
14 amount. I'm not certain what we said in the applicat-  
15 ion.

16 Q Mr. Hushion is holding up  
17 six fingers, is that correct?

18 WITNESS KOSTEN:

19 A Presumably 60 feet.

20 Q All right. So what we  
21 may contemplate, if we include the laterals, is that  
22 there will be five construction seasons?

23 WITNESS MIROSH:

24 A Yes, if you include clear-  
25 ing in the first season.

26 Q And that indeed for the  
27 compressor stations, the construction will go on another  
28 year, if not two?

29 A Yes. Let me just review  
30 that. The first season is clearing, the second would be



1 the first year of main line construction, the third year  
2 would be the second year of main line construction and  
3 the first year of lateral construction, and the fourth  
4 year would be the completion of lateral construction,  
5 so we are talking four years.

6 Q Oh I see, so that the  
7 first year of lateral construction to Yellowknife, will  
8 be the last year of main line construction?

9 A Yes, that's the way we put  
10 it forward.

11 Q Yes. Well now, Mr. Kosten,  
12 I think I understood you to say to Mr. Genest yesterday,  
13 when you were talking about the possibility of building  
14 55 miles a spread, an average of 55 miles a spread, that  
15 you were not responsible for the opinion that Arctic Gas  
16 might very well end up building less than 55 miles a  
17 spread?

18 WITNESS KOSTEN:

19 A I believe I stated I was  
20 not familiar in detail with their schedule.

21 Q I take it your responsi-  
22 bility was to prepare the data and to do the analysis  
23 which projected the spreads for Foothills and projected  
24 the average of 55 miles?

25 A That is correct, sir.

26 Q And whatever Foothills did  
27 with that is really not your responsibility?

28 A In essence that is correct.  
29 I believe they relied on our information.

30 Q Well who's the chap who



1 decided that Arctic Gas couldn't build 55 miles?

2 Well if nobody decided that, we  
3 can just take it out of the canned evidence, but I pre-  
4 sume because it's there that someone analyzed the figures  
5 and concluded that Arctic Gas couldn't do that.

6 WITNESS BAUER:

7 A Maybe I should take  
8 responsibility for that, sir.

9 Q Well was it your decision,  
10 your conclusion?

11 A Well it was my recommend-  
12 ation.

13 Q Well it's not a recommend-  
14 ation, is it? It's a conclusion.

15 WITNESS KOSTEN:

16 A I'm not sure who said that  
17 they couldn't build 55 miles, sir.

18 Q Well I think it was either  
19 Mr. Bauer or Mr. Mirosh, and --

20 THE COMMISSIONER: It was Mr.  
21 Mirosh.

22 WITNESS MIROSH:

23 A I think we said they were  
24 proposing an average of 75 miles per spread.

25 MR. SCOTT:

26 Q And there were two con-  
27 clusions drawn. The first was that they couldn't get  
28 75 miles a spread. Let me just read it to you, it's at  
29 page number 2, and it is in the evidence of Mr. Mirosh,  
30 and it says this in the first full paragraph on that





page, and I'm interested in it because it doesn't have anything to do with Foothills' application, it has to do with Arctic Gas' application.

A Yes, it's a comparison of the two projects, highlighting the differences.

Q All right. "Since both projects would require the same contractors working with the same labour pool and the same equipment to undertake either job, then Foothills considers that CAGSL have overestimated the productivity that is attainable under the circumstances".

Now, who drew that conclusion?

A I'm responsible for writing that evidence.

MR. GENEST: I might add, sir, if Mr. Scott won't mind the interruption, that I have a note that Mr. Commissioner interjected here and said and brought out the answer that Foothills feels that CAGSL may not even get 55 miles.

MR. SCOTT: Well the sentence goes on, and I'll be coming to that in a minute, but first of all, Mr. Mirosh, is that your conclusion based on the analysis of Mr. Kosten?

A Well it's based on that as well as the discussions with Mr. Bauer and the implication that our spread build-up is on a conventional pipeline, one that has been handled before. The CAGPL project, as I said earlier, is based on a non-conventional pipeline in that there are unknowns, such as crack arrestors and the implications they would have on



construction, that it's a larger project.

Now, on the basis that our calculations show, and the discussions on snow roads show that we can make it but we don't have a great deal of room on either side, it's easy to draw a conclusion that it would be more difficult for a larger pipeline with unknowns, attempting to do more miles, to have a far more difficult job.

Q So could we again put it into that category of case that it is not so much a calculation as an impression?

A Well it's a calculation in that we have calculated the requirements for a 42 inch pipeline, and we know that they are significant. The implication one draws from that is that it is more than significant for anything larger.

THE COMMISSIONER: Well Mr. Mirosh, can you put it this way. Are you saying that you people calculated that building a 42 inch pipeline and taking a reasonably conservative approach and not counting on extended -- an extended snow road season, you felt you could do 55 miles per winter per spread, when you have thus determined what you are capable of, you look at Arctic Gas' proposal that they would build a 48 inch pipe, 75 miles per winter per spread, larger diameter, features never previously used in conventional pipeline construction, a larger project, and you felt that their estimate of 75 miles per main line spread per winter was quite unrealistic. Is that really how you reached that conclusion?



A Yes sir. We felt that we were realistic and the impact on such things as movement of material for the other project is some 30 percent greater than ours. Taking all of these things into account and recognizing that there is a certain window, in terms of time, that we have to work with and we can make it, we extrapolate that we find it would be difficult for a much larger project to do the same.

THE COMMISSIONER: Well instead of calling it a matter of impression as Mr. Scott would have you do, would you call it a matter of judgment?

A Yes, it's a matter of our judgment.

MR. SCOTT: Well Mr. Mirosh -- I'm sorry, sir, are you finished?

THE COMMISSIONER: Yes.

MR. SCOTT:

Q Well Mr. Mirosh, I take it you considered the extra work force that CAGSL would have?

A Yes, they do have an extra work force.

Q And you considered the rather different program of construction that they proposed?

A Well I'm not certain in what ways it's different.

Q Perhaps you didn't consider it. Did you consider the --

MR. HOLLINGWORTH: That is



surely not a fair impression from that answer, is it, sir?

MR. SCOTT:

Q Well let me ask the question this way, I withdraw it. Did you make any analysis with which you can provide us, upon which you compare these two projects and make that kind of statement? Or is it just a question of -- as the geotechnicians would say -- surficial judgment?

A Well it's a question of judgment based on our understanding of our project, and the difficulty which we would see extrapolating that into a much larger one.

Q All right. Did you make any written or other analysis of the two projects comparing them side by side?

A No sir.

Q No, all right. Now the next statement goes a little further, in fact rather than the CAGPL project showing a better productivity rate, it may well show a lesser productivity rate", and that means lesser than 55 miles, I take it, "...in view of the larger diameter, thicker wall pipe and crack arrestors involved in that project".

Now, did you make any analysis to enable you to draw that conclusion?

A No, my answer would be the same. It's again based on just making it with our project, and finding it difficult to see how a larger project could fit.





Q And I take it that in making both those judgments you relied very much on the spread analysis that Mr. Kosten was able to do for you?

A Yes, and the implication that a contractor had assisted in developing this.

Q All right. Well now, Mr. Kosten, I take it, if I understand it correctly, that you have averaged it out at 55 miles a spread per season?

WITNESS KOSTEN:

A That's what the average is, yes.

Q Yes, and dealing with the very far north, as Mr. Genest did yesterday, spread 1, for example, you estimate that in the first season 44 -- if you refer to the index map, you emphasize that 44 miles is your estimate in the first season?

A Of that section, yes.

Q And in the second season it's 45 miles?

A I believe that would be correct.

Q And I think --

A Or vice-versa.

Q 44, 45 for the first and the second year is the way I have it. I think in a protracted examination with Mr. Genest yesterday, you said that these relatively low productivity rates, about which he was complaining I think at the time, were made to take account of basically two things, lower



1 | temperatures and poor light conditions in part of the  
building season?

A I guess it would be fair  
to say that we are trying to stay out of the poor light  
condition.

Q Yes, but it's the poor  
light condition that reduces the season, which leads to  
a smaller mileage?

A This is our conclusion,  
10 | yes.

Q And just so I have it  
correctly, there were two factors I think that you men-  
3 | tioned, and perhaps that's all of them, the light  
14 | conditions, the problem of light on spread 1, and the  
problem of temperatures?

A Yes, sir.

17 | Q And that is why you come  
18 | up with 44 and 45?

A That is correct, sir.

20 | Q And I take it --

21 | A I might say in that  
22 | spread, sir.

23 | Q Yes, in that spread, and  
24 | we are talking only about it for the moment, and I take  
25 | it that that kind of judgment is critical, because it  
26 | will affect the entire project in its average mileage?

A Yes sir.

28 | Q And any error there is  
29 | likely to be critical in terms of the average that can  
30 | be achieved across the whole route?



A I'm not sure I follow the implication of that statement.

Q Well let me put it to you this way. If, and I'm sure I can't, but if I were able to show you that in fact you're wrong about the light and you are wrong about the temperature and you can build 60 miles, that is going to affect your average for all the spreads?

A It probably would, yes.



Q Well now, against that background, I'd ask you to look at figure 3D3.2.

The Commissioner: 3B?

Q 3D.  
It's the one we were looking at yesterday it's the map of the -- Mr. Commissioner it's this one that looks like a -- spread 1D.

Mr Kosten, I'd ask you to look at the writing on the side of that under spread 1D where you deal with the second construction winter which I understand is winter three. Do you see that?

A Yes sir.

Q And that says, after building winter roads, mainline construction commences at the termination point of spread 1B, that would be the place where you terminated building the year before, is that correct?

A I believe that could be implied, yes.

Q And proceeds southward to MP 89, the Parsons Lake lateral is installed by the mainline construction spread, spread 1D utilizes camp facilities at compressor station sites 1 and 2, the Parsons Lake meter station construction is completed. Now I put it to you what you're saying there is that you are building the rest of spread one in winter three and the Parsons Lake lateral?

A My recommendation to Foothills was that the mainline spread would not build that particular section.





1 Q Just let me see if you  
2 can help me with this question. That paragraph which  
3 after all is part of the application. You said yesterday  
4 that you weren't responsible for it and may not have  
5 read it even and I don't blame you for that, but that  
6 paragraph says that you're going to build the other  
7 half of the spread, and the Parsons Lake lateral?  
8 Isn't that what it says?

9 A That's what it says.

10 Q And that will be 45 miles  
11 plus 16 miles which is the length of the Parsons lateral?

12 A Yes sir.

13 Q So in the winter two,  
14 on spread 1D, notwithstanding the light and the temper-  
15 ature, the application indicates that you will build  
16 60 miles?

17 A I'll have to let Mr.  
18 Mirosh deal with that one.

19 Q Just before we get to  
20 Mr. Mirosh, you're going to ask him to field the  
21 conclusion.

22 A I don't feel that that  
23 lateral will be built with the mainline spread

24 Q That may be so, but that's  
25 what the application says, isn't it?

26 A Yes sir.

27 Q Yes, the application on  
28 its face says that 60 miles will be built by this spread  
29 in this winter.

30 A That's what the application



1 says yes.

2 Q All right, now if Mr  
3 Mirosh wants to deal with it he can.

4 WITNESS MIROSH:

5 A Well that's what the  
6 application says, yes.

7 Q And that's what you're  
8 going to do, isn't it?

9 A I can't recall it  
10 right now, well that's what we plan on doing , it's in  
11 our application, but I can't recall whether we costed  
12 out a separate spread, for that operation or not, I  
13 suspect that we -- I'm advised that we did cost  
14 that in as part of that spread.

15 Q And I take it -- is that  
16 realistic in view of what was said yesterday?

17 WITNESS KOSTEN:

18 A For purposes of costing,  
19 we used the same base data that we used for the mainline  
20 spread. It was not my intention to build that portion  
21 with the mainline spread.

22 Q I'm not troubled by  
23 costing at the moment, which is something I'm prepared  
24 to leave to the National Energy Board and to the company.  
25 What I'm concerned about, is your observation yesterday  
26 that this would be an impossible task and the thing that  
27 troubles me, not only with this spread, but with all the  
28 others is that the evidence of the application indicates  
29 that 60 miles will be built, not by some other spread,  
30 but by this spread. Now, are we to look at the  
31 application or do you want to amend it or what do you want



1 to do?

2 A Well until we amend it,  
3 that's what we have put forward. I might point out  
4 though that that is a 30 inch lateral and should not be  
5 construed as requiring the same effort per mile as the  
6 mainline.

7 Q No, I'm sure it won't and  
8 you may only be clearing a little less too, Are you  
9 clearing 60 there or what? Well you won't be clearing  
10 any if there's nothing to be cleared there?

11 A Yes, that's barren  
12 territory.

13 Q Well I take it that  
14 when you made your judgment about what Arctic Gas  
15 could or could not do, you were operating on the  
16 assumption that you could, on this spread for example,  
17 only build 45 miles.

18 A Plus the Parsons Lake  
19 lateral.

20 Q Well, all right, plus  
21 the Parsons Lake lateral. Are you telling us now that  
22 your estimate is that in spread one you can build 60  
23 miles in winter two?

24 A Well I think for the  
25 purpose of the application, that is what we show. but --

26 Q When you made your judg-  
27 ment about Arctic Gas's ability to perform, were you  
28 thinking that you could only do 45 miles on spread one  
29 or were you thinking, as your application says that you  
30 could do 60, it does make a difference?  
31



1 A Well we were thinking at  
2 that time that an arrangement would be made, it would  
3 be possible with the construction crews that are putting  
4 in the gathering systems for the Parsons Lake plant,  
5 but in terms of showing it on the application, we did  
6 not show it that way.

7 THE COMMISSIONER:

8 Q Are you saying that  
9 you got this lateral down here, and ostensibly, according  
10 to the application, it's to be constructed by the crew  
11 at spread one, and yet you had in mind turning to the  
12 producer's crews and building the gas plants in the  
13 delta, to build that lateral to Taglu or wherever it is?

14 A Yes, there is an amount of  
15 gathering pipeline that has to be built associated with  
16 the Parsons Lake gas plant and depending on when that  
17 construction would be scheduled, it would be feasible  
18 for us to utilize that same spread since it will be up  
19 in the area.

20 MR. SCOTT:

21 Q Well Mr. Mirosh, whether  
22 you now tell us that this 60 miles is going to be  
23 built by somebody else or whether you now tell us that  
24 it is going to be built in a separate spread, I take it  
25 that you assume that that 60 miles was going to be built  
26 when you made the application?

27 A Well I don't quarrel with  
28 what words are on figure 3D3.2 which you've pointed out  
29 to us. But in fact we did discuss as I had stated,  
30 utilizing the construction crew that would be building the





1 gathering systems for the Parsons Lake gas plant.

2 The Commissioner: Q But it says here, the  
3 Parsons Lake lateral is installed by the mainline  
4 construction spread.

5 A Yes.

6 Q You're telling us now,  
7 Mr. Mirosh, that you don't think that is a practical  
8 proposition and you don't want to stand by that. Rather  
9 you want to arrange for the producers construction crew  
10 building the gas plants and the gathering lines, to  
11 build the Parsons Lake lateral?

12 A Yes, well I do recall  
13 a recommendation that Mr. Kosten made to us at that  
14 point in time and it was, as he said, that that not be  
15 done by the mainline crew, I can't quarrel with the  
16 fact that we have made that statement in the application,  
17 that Mr. Scott has pointed out.

18 Mr. Scott: Q Mr. Mirosh, the point I  
19 want to make very simply is that -- and we'll come on  
20 to deal with your application in a moment. Bearing in  
21 mind the state of your application, and the extent to  
22 which you are prepared at this stage to qualify what  
23 you have said in it, do you really think you're in a  
24 position to make an informed judgment about the  
25 ability of another company, building another pipeline  
26 with another crew, and perhaps with another construction  
27 method, to do what they say they're going to do?

28 Or do you think that judgment  
29 is really a little premature bearing in mind some of  
30 the things we have seen and will see?



1 A I think that judgment is  
2 reasonable from the point of view that we have done  
3 our calculations and we know that we have a certain  
4 amount of time to do it in, if you work on some of the  
5 premises that have been discussed earlier, that you can  
6 get in a lot earlier, that you can build snow roads that  
7 would give you good service a lot earlier, that you wish  
8 to work in darkness, that you can overcome the construction  
9 difficulties that crack arrestors may put forward  
10 to the crews, such as coating. installation, if you make  
11 all of those assumptions, then you would come to a  
12 different conclusion. But we made the opposite  
13 assumptions.

14 Q All right, so that is the  
15 level of judgment that you regard as satisfactory?

16 Perhaps that's a rhetorical  
17 question?

18 A Yes, I think we feel that  
19 we have put forward a realistic plan, albeit that you  
20 have --

21 Q No, I'm not talking about  
22 your plan, I'm talking about your judgment of the others  
23 plan?

24 A Yes. again with the  
25 provisions that I put forward. If you wanted to  
26 accept all of those factors and say that they're not a  
27 problem, and they are considerable in our opinion, but  
28 if you accept them as not being a problem. then  
29 certainly, they can go right ahead and get at it a lot  
30 earlier and very likely do the job, but you have to



1 make assumptions which we're not prepared to make.

2 The Commissioner: Q Well then you're conceding  
3 you can't have it both ways sir, that if -- that if  
4 you want us to consider your judgment as to Arctic Gas's  
5 program, you have to concede that your crew at spread one  
6 couldn't build 44 miles of mainline and do the Parsons  
7 Lake lateral too.

8 A Yes, that was the advice  
9 given to us and unfortunately it's now shown that way.

10 Mr. Scott: Q Why didn't you tell us  
11 that?

12 A It took me a minute to  
13 recall it.

14 Q This is, as I see, it,  
15 I may have mistaken it, but this is a fundamental  
16 deviation from the plan that you put forward in  
17 your application, and I guess if we've never asked you,  
18 we would never have heard about it.

19 A Well you probably would  
20 have when we would have revised our -- or amended our  
21 application.

22 Q Are there any more at  
23 home like this?

24 A No, I would suspect that  
25 you found one and Mr. Marshall found one, I can't think  
26 of any others.

27 Q I don't know about  
28 Mr. Marshall but I've finished looking for the moment.  
29 Let's move on to something more boring.

30 THE COMMISSIONER: Before you



1 do you have any idea Mr. Mirosh whether the producers's  
2 construction program relating to gathering lines at  
3 Parsons Lake, will be occurring, within the same  
4 year as the year that you will be completing the  
5 construction of the mainline, or do you know who is going  
6 to construct their gathering lines assuming they  
7 are allowed to proceed with them?

8 A No sir. we have attempted  
9 to meet with the producers to discuss engineering  
10 aspects such as this and have not been successful so  
11 far in obtaining these meetings.





1 THE COMMISSIONER: Fine.

2 MR. SCOTT:

3 Q Well now, do I understand  
4 from your evidence that the decision to clear the entire  
5 main line in winter one, is a decision that is made as a  
6 result of a desire to spread out the work to -- so that  
7 employment opportunities will be available in an addi-  
8 tional season?

9 MR. HOLLINGWORTH: Well with  
10 respect, sir, I don't think that the evidence is that  
11 we are --

12 MR. SCOTT: All right, he will  
13 tell me if it's not. I thought it was the evidence.

14 MR. HOLLINGWORTH: He's asking  
15 a double barrelled question.

16 MR. SCOTT: Well let me -- I  
17 will take it stage by stage.

18 Q Is the evidence that in  
19 winter one you are going to clear the entire main line  
20 route, except for sensitive permafrost areas?

21 A Yes, with the exception  
22 of sensitive permafrost areas.

23 Q All right. Well now, do  
24 I understand from your evidence yesterday, that that  
25 decision to do it then was made principally to extend  
26 the life of the project by one year this side, and  
27 thereby offer employment opportunities that might not  
28 otherwise be either available or as spread out?

29 A Well that and also the  
30 attempt to reduce the peak manpower requirements for the



1 subsequent years.

2 Q All right. Well now was  
3 any study done, bearing in mind that half of the main-  
4 land right-of-way will be exposed to thaw for two  
5 summers? Was any study done about the impact of those  
6 thaw periods on the terrain?

7 A Well there is a study which  
8 we have talked about before, related to geothermal  
9 modelling, but we do have -- or we have observed the  
10 CNT line which the winter road has been predominantly  
11 built on, and find that this right-of-way, which has  
12 been in existence for many years, and which really has  
13 not had a great deal of stabilization or erosion control  
14 measures applied to it, appears to be standing up well.

15 Q Well let me point out  
16 what I am getting at. Arctic Gas has gone to great  
17 pains, wisely or unwisely, to emphasize that they will  
18 do clearing immediately before construction, and they  
19 have provided some geotechnical rationale for proceeding  
20 in that way.

21 Now, you're proceeding in an  
22 entirely different way, which will allow part of the  
23 right-of-way to be exposed to thaw for one summer and  
24 the other half to be exposed to thaw for two summers.  
25 Now --

26 MR. MARSHALL: Now excuse me,  
27 Mr. Scott, just on that point, just so that the record  
28 is clear. As I understand it, and I have checked it  
29 with Mr. Williams, the Arctic Gas plan would be to clear  
30 the right-of-way the winter before construction --



1 MR. SCOTT: I'm sorry.

2 MR. MARSHALL: -- in the event  
3 that machine clearing was being used. If hand clearing  
4 was being used, then the clearing would be done the  
5 summer immediately preceding construction.

6 MR. SCOTT: All right.

7 Q Well bearing that compari-  
8 son in mind, I take it that at the best, your right-of-  
9 way will be exposed to one thaw season that the Arctic  
10 Gas right-of-way, or half of your right-of-way will be  
11 exposed to one thaw season that the Arctic Gas right-of-  
12 way will not be exposed to?

13 A Yes.

14 Q Are we agreed there?

15 A Well, there will be ex-  
16 posed right-of-way, I'll agree with it, but --

17 Q For two thaw seasons?

18 A Yes, in some cases --  
19 well of course for the entire life of the pipeline, the  
20 right-of-way will be exposed.

21 Q Right.

22 A But we are not clearing,  
23 in advance, the areas which we will determine are  
24 sensitive permafrost, and doing that we feel will not  
25 expose right-of-way prior to pipeline construction which  
26 would be subject to degradation.

27 Q Have you any report or  
28 geotechnical advice to which you can refer us, about  
29 the impact of that proposal?

A I can't think of one right



1 now.

2 Q Is there any reason why,  
3 if the trade-offs are made differently, you should not  
4 pursue the course that Arctic Gas has proposed? With  
5 respect to clearing?

6 A I think this has been  
7 pointed out. There is no reason why we can't clear in  
8 advance of pipeline construction if we did not wish to  
9 reduce the manpower level required during the first year  
10 of pipeline construction, or if we did not wish to pro-  
11 vide a period of training and familiarization for those  
12 in the north to work on the project.

13 Q All right, so there's no  
14 reason apart from that factor why you can't do what  
15 Arctic Gas is doing or proposing?

16 A Well aside from those  
17 reasons, there is no reason.

18 Q All right. Well now  
19 let's come to something else about clearing. I under-  
20 stood that --

21 THE COMMISSIONER: Excuse me,  
22 Mr. Scott. Mr. Marshall, you said that Arctic Gas  
23 intends to clear the summer before construction begins,  
24 but where machine clearing is required, you will do the  
25 work in the winter before construction?

26 MR. MARSHALL: Yes, sir.

27 MR. SCOTT:

28 Q Well now let's --

29 MR. MARSHALL: Yes, it is  
30 summer if there is hand clearing to be used, it will be





1 done in the summer. There is a figure in the Exhibit 55  
2 13A2.3.1 in that section, that is the bar chart shows  
3 when the machine clearing would be done, and it shows  
4 it in the winter preceding the winter in which pipe  
5 would be laid. Mr. Williams confirms it. If it was  
6 hand clearing, it would be done the summer immediately  
7 preceding the pipe laying.

8 MR. SCOTT:

9 Q Well now if I may come to  
10 clearing, Mr. Bauer's written evidence in question 11,  
11 in dealing with clearing, says that no particular aspects  
12 of this are unique, and he goes on to indicate that hand  
13 clearing of the right-of-way will be done only in areas  
14 where the timber is of merchantable quality, and I take  
15 it, Mr. Bauer, that is so the timber can be merchan-  
16 dized?

17 WITNESS BAUER:

18 A That is correct.

19 Q And apart from that, you  
20 will be utilizing machine clearing?

21 A Wherever practical.

22 Q I beg your pardon?

23 A Wherever practical.

24 Q Well except where you can't  
25 get the machines in for some reason?

26 A Yes.

27 Q Yes. Well now contrasted  
28 with that, I am going to ask you about this, is the  
29 Arctic Gas evidence that hand clearing would be used  
30 whenever machine clearing would produce detrimental



1 environmental consequences, and that it would be used  
2 extensively in areas requiring Arctic construction.

3 Now, I put it to you that there  
4 is a difference between those two approaches, which I  
5 can summarize this way, Arctic Gas is going to rely  
6 extensively on hand clearing; you will utilize hand  
7 clearing only where machines are inaccessible or where  
8 the timber is of merchantable quality. Have I got that  
9 right?

10 A I would say, sir, there  
11 is basically no difference at all between Arctic Gas  
12 and ours, as far as their approach is concerned.

13 Q Well why do you say in  
14 your evidence, which after all is what we rely on, that  
15 hand clearing will be used only where timber is of  
16 merchantable quality? That's entirely different from  
17 what Arctic Gas says, as I read it.

18 A Well there are various  
19 ways of expressing but as far as when you talk about  
20 machine clearing, you are using those shears which are  
21 attached to bulldozer blades, so you cut the trees  
22 down. Where you don't use machines, you use your power  
23 saws, that's hand clearing again.

24 Q No, but am I correct  
25 about your evidence, that the proposition is this:  
26 Leaving aside areas where machines can't get in for the  
27 moment, the proposition is this, that you will use hand  
28 clearing only, as you say, where the timber is of  
29 merchantable quality, and the rest will be machine  
30 cleared.



1 A But that's not quite so,  
2 sir.

3 Q That's what you say.  
4 Perhaps you can explain what you intended?

5 A Our primary clearing  
6 appearing to CAGSL as Mr. Marshall pointed out, is done  
7 in winter months.

8 Q Well let me ask you this.  
9 Have you read Arctic Gas' evidence on the construction  
10 panel about clearing?

11 A I just learned again from  
12 Mr. Marshall what he pointed out here.

13 Q Well let me ask you this.  
14 Is Foothills prepared to hand clear in every area where  
15 the advice is that there is -- that there will be  
16 environmental consequences from machine clearing?

17 A Definitely.

18 Q And we may regard your  
19 evidence then amended so that you will hand clear, not  
20 only where timber is of merchantable quality, but in  
21 every area where there will be adverse environmental  
22 impacts from machine clearing?

23 A Well I would say, sir,  
24 it was a pre-conclusion that the environmental aspects  
25 are number one.

26 Q Well I know that, but  
27 will you do what I say? Or are you going to stick to  
28 merchantable timber?

29 A No, no, I mean I concede  
30 that was the intent. It may have been written rather



1 poorly or something.

2 Q All right.

3 WITNESS MIROSH:

4 A There are, if I could just  
5 add, some machines that we have been considering, and  
6 perhaps that's the reason for Mr. Bauer's conclusion  
7 of that statement.

8 There are shears which we  
9 recognize are available and have been used that can  
10 handle up to 18 inch diameter timber, and which can be  
11 mounted on low ground pressure vehicles. There is also  
12 another device which I believe is called a Hydro axe,  
13 which can again be mounted on low ground pressure  
14 vehicles, and which can clear stands of scrub timber up  
15 to 20 foot high, 4 to 5 inches in diameter, and mulch  
16 them if they can be mulched in certain areas.

17 These are possibilities, and  
18 providing that the low ground pressure vehicles could  
19 be implemented environmentally, then they could be  
20 used, but your statement would be correct. If there is  
21 an environmental problem, they would be hand cleared.

22 Q All right, well I am glad  
23 to have that assurance.

24 Now what I want to ask you is,  
25 is there any advice or study that we can be referred to  
26 which indicates the difference in environmental impacts  
27 between hand clearing and machine clearing, upon which  
28 you will rely in deciding which to do where?  
29 Have you got any advice on that subject?

30 A Well we have talked with







1 the North -- not North Can -- I'm sorry, the name of the  
2 group escapes me, but the people working on the  
3 Mackenzie Highway.

4 Q You see, Mr. Mirosh, if I  
5 can interrupt you, the trouble for the moment is that  
6 you have now made me understand your evidence in chief  
7 and it's not hand clearing where it's merchantable  
8 quality only, it's hand clearing where there are any  
9 adverse environmental impacts.

10 Now, what I want to get at, is  
11 have you had any advice on how you are going to isolate  
12 those, that we can refer to? Frankly it doesn't help  
13 me to have a report of some meeting you have had or  
14 conversation you have had. Is there any study underway?

15 MR. HOLLINGWORTH: Maybe you  
16 should let him finish his answer, you might get what you  
17 were looking for.

18 MR. SCOTT: Oh, I am prepared  
19 to take that chance.

20 Q Go ahead, Mr. Mirosh?

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1 A Well Hire North was  
2 the group I was referring to. We have had general  
3 discussions with them about clearing. but no. we  
4 don't have a study at the present time, that specifically  
5 delineates where hand clearing, where merchantable  
6 timber is or where machine clearing would be implemented.

7 Q Are you going to do one?

8 A Yes, this would be a  
9 requirement prior to construction.

10 Q Who is going to do it?

11 A Well I imagine we would  
12 either utilize Lombard North or if they don't have the  
13 expertise, we would go to a forestry consultant.

14 Q I see. Are you aware  
15 that the right of way for the Mackenzie Highway has  
16 been almost entirely hand cleared?

17 A Well from observing  
18 some of the stumps (it looks as if they used some sort  
19 of shearing or other equipment.

20 Q Have you made any  
21 inquiries of them as to their experience about clearing  
22 and environmental impact?

23 A Yes, we have talked to  
24 them, but --

25 Q Have they given you any  
26 reason why they have handcleared almost exclusively?

27 A Yes, primarily to employ  
28 personnel.

29 Q Have they given you any  
30 environmental information about the impact of hand clearing?



1 as opposed to machine clearing?

2 A Well I think that they  
3 would have used machine clearing in areas if they wished  
4 to get a higher productivity rate.

5 Q Mr. Mirosh, perhaps you  
6 can just see if you can answer my question. Have they  
7 given you any information about the environmental impacts  
8 of hand clearing as opposed to machine clearing?

9 A No sir.

10 Q Now let's turn to another  
11 subject. In view of your proposal to clear the right  
12 of way one or two years ahead of construction, can you  
13 tell us when you intend to grub out the tree stumps, is  
14 that going to be done in the clearing process, or is  
15 that going to be done immediately before construction?

16 A Well, in the non-  
17 sensitive permafrost areas, where we would be doing the  
18 clearing, we would anticipate on side slopes, where we  
19 had to do grading to be grubbing out at that point in  
20 time, right after the clearing and stabilizing the slope  
21 immediately following. This may not be true in every  
22 case, but there would be some of that, in advance of  
23 construction by one year, two years.

24 Q So do I understand then  
25 in what you judge to be sensitive permafrost areas,  
26 that the grubbing of stumps will take place immediately  
27 before construction?

28 A Yes, if it's required.

29 Q Yes. Well where there  
30 are tree stumps it may be required.



1 A Yes, on a side slope it  
2 may be required if we have to do grading. It depends  
3 on how high the stumps are.

4 Q I take it that it's  
5 apparent that you made no allowance in your bar charts  
6 for this sort of work immediately before construction.

7 A I'm not certain without  
8 referring to it whether we show a grading line there.

9 Q In any event, it's not  
10 going to be done until the winter roads are in place  
11 is it?

12 A Yes there is a grading  
13 item underneath pipeline construction which would take  
14 care of that.

15 Q Yes, but I take it from  
16 looking at the chart that that is such a small item  
17 in terms of manpower, that it's apparent that the bulk  
18 of the grubbing is going to be done when the clearing  
19 is done.

20 A Yes since the bulk  
21 of the clearing will be done in advance of pipeline  
22 construction.

23 Q So can we assume then that  
24 for the most part, the grubbing will be done in the  
25 clearing season?

26 A Yes where it's  
27 required.

28 Q Have you had any studies  
29 done of either geothermal or hydrological about the  
30 impact of grubbing one or two years in advance of con-





1 construction, in terms of drainage or heat?

2 A Yes, we have had a great  
3 deal of input from our environmental people on this and  
4 from the geotechnical people. And the requirement here  
5 would be to ensure that we institute stabilization and  
6 doerosion control measures at that time if we dig into the  
7 ground just the same as we would if you left it until  
8 pipeline construction.

9 Q So would it be correct to  
10 say then that insofar as your clearing process involves  
11 grubbing, the clearing process is going to involve the  
12 installation of remedial drainage solutions and so forth?

13 A Yes, where we do grading,  
14 that would be required.

15 Q And that will be over  
16 a substantial length of pipeline?

17 A Well I'm not sure if it  
18 is substantial, but it will be certainly required in many  
19 areas.

20 Q Now you said you had some  
21 environmental or geotechnical advice on this aspect of  
22 the matter. Is there anything to which you can refer us?

23 A Yes, the geotechnical  
24 section does show a number of measures that would be  
25 implemented for stabilization and erosion control.

26 Q Well I think perhaps you  
27 misunderstood me. You've referred to the part of the  
28 application that deals generally as I take it with  
29 drainage and erosion control. What I'm asking you, is  
30 there anything to which you can refer us in the way of



1 advice as to the particular problems that may be  
2 associated with and solutions that would be proposed  
3 to deal with grubbing one or two years in advance of  
4 construction?

5 A Well they would be no  
6 different than the problems which we'd have to deal with  
7 at construction.

8 Q I understand it's your  
9 judgment it would be no different and I respect that.  
10 Have you anything to which you can refer us from someone  
11 who has expertise in this area?

12 A I'm just trying to recall  
13 if we have anything on that. I think aside from the  
14 geotechnical section in the application, and the sub-  
15 sequent geotechnical reports which are being compiled  
16 based on the preliminary site specific work, I have  
17 nothing else to offer.

18 Q Now on the subject of  
19 grading, I note in Mr. Bauer's evidence, fairly  
20 early on, I don't have the page number, --

21 THE COMMISSIONER: It's page  
22 8. Second page of Mr. Bauer's evidence. Top of the  
23 page.

24 MR. SCOTT:

25 Q In paragraph B dealing  
26 with grading. the third complete sentence, Mr. Bauer  
27 says, "in areas that are not muskeg a mound is formed  
28 over the ditch line to prevent frost penetration."  
29 Not I take it that that applies to non muskeg areas  
30 and the mound Mr. Bauer, would I take it be brush and



1 other material of that type, would that be correct?

2 WITNESS BAUER

3 A Well by mound, the  
4 primary purpose of this mound --

5 Q I'm not asking you the  
6 purpose at the moment, I'm just asking you what it would  
7 be.

8 A Snow.

9 Q Snow. so you're going to  
10 after grading in non muskeg areas, build a mound over  
11 the ditch line of snow?

12 A That is correct

13 Q Yes, and I take it that  
14 the purpose of that as you say is to prevent frost  
15 penetration?

16 A Correct.

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1 Q Are you going to do this  
2 in permafrost areas?

3 WITNESS KOSTEN:

4 A Might I answer that one?

5 Q No, I would like Mr. Bauer  
6 to answer it for the moment, Mr. Kosten. I will come  
7 back to you in a moment.

8 WITNESS BAUER:

9 A We would do it wherever  
10 practical.

11 Q In permafrost areas?

12 A Yes.

13 Q Why would you do it in  
14 permafrost areas to prevent frost penetration? You  
15 will be doing this in the winter, the ground will be  
16 frozen solid. You are going to build a snow mound  
17 along the top of it to prevent frost penetration. Now  
18 I understand you do that in the south all right, where  
19 the frost hasn't penetrated, but why are you going to  
20 do that north of 60 in the middle of the winter?

21 THE COMMISSIONER: Where the  
22 ground is already permafrosted, is that the point?

23 MR. SCOTT:

24 Q Solid as a rock. Why  
25 would you do that?

26 A To assist the ditching  
27 operation.

28 Q How is it going to assist  
29 the ditching operation?

30 A Well quite simple because





1 the normal procedure for ditching, the wheelditcher you  
2 cannot supply in most cases.

3 Q But Mr. Bauer, I put it  
4 to you that what you are talking about is southern  
5 Alberta. This is ground that is frozen solid with  
6 permafrost, in the middle of winter, and you are going  
7 to have all these people and they will be grateful for  
8 the employment, building snow mounds to prevent frost  
9 penetration.

10 A That's primarily on the  
11 southern portion.

12 Q It's what?

13 A It's primarily in the  
14 southern portion, say, for instance south of Fort  
15 Simpson.

16 Q It's going to be frozen  
17 wherever you do it. You're doing it in non-muskeg  
18 areas, to begin with.

19 The point I'm making, Mr. Bauer,  
20 and it's not just because I am concerned about this  
21 little thing; the point I'm making is that the sense  
22 of your evidence is that you're talking about some other  
23 place and some other time, that you're not talking about  
24 north of 60 in the middle of the winter. This would be  
25 terrific down where I live in southern Ontario, you  
26 want to keep the frost out of the ground so you can dig  
27 your ditch, but surely it's just out of this world when  
28 you are talking about the Territories in January?

29 A Well I refer that question  
30 to Mr. Kosten because he has some actual experience in



1 that particular --

2 Q Well before we get to Mr.  
3 Kosten, would you agree that that particular proposal,  
4 you're unable to explain to me?

5 A I shouldn't say unable,  
6 but it is Mr. Kosten who had the actual experience,  
7 that's what I am saying.

8 Q I see. All right, Mr.  
9 Kosten, will you explain why that's to be done?

10 WITNESS KOSTEN:

11 A Well you wouldn't do it in  
12 permafrost.

13 Q So the sentence --

14 A The implication here is  
15 a general description of what normally happens on a  
16 winter construction project, sir.

17 Q Yes, but not in the North-  
18 west Territories?

19 A In non-permafrost areas.  
20 If the ground is not permafrost, and you want to prevent  
21 frost penetration in non-permafrost areas along your  
22 ditch line.

23 Q Well what proportion of  
24 the line would that be? Five percent?

25 A I couldn't give you a  
26 quantitative amount at this point in time, sir.

27 Q It would be very small  
28 if you exclude the muskeg areas?

29 A It could be substantial.  
30 I wouldn't be able to offer you a figure on it.



1 Q But you would agree with  
2 me that that proposal for construction, for Arctic  
3 Construction, will just have no utility whatever?

4 A Your proposal being?

5 Q The proposal contained in  
6 the proposal relating to grading on page 8?

7 A Yes, I don't believe Mr.  
8 Bauer was talking about permafrost areas there.

9 Q Well he told me he was.  
10 You would agree with me, surely, that it can have no  
11 application to any part of the route north of Good Hope,  
12 and can have -- and if you exclude the muskeg, can have  
13 limited application to any part of the route south of  
14 --

15 A I don't agree with your  
16 statement that none of the area north of Fort Good  
17 Hope -- I'm sorry, that's okay. South of there, you  
18 could have significant amounts of areas where you would  
19 require frost penetration prevention measures, when you  
20 are not in permafrost.

21 Q In the middle of January?

22 A Yes, sir.

23 Q What percentage of the  
24 line? Have you any estimate?

25 A No, I wouldn't care to  
26 offer any, sir.

27 Q Well let me ask you this:  
28 This is put forward, for better or for worse, and is  
29 solemnly read into the record as a general approach to  
30 construction, and no matter how we may interpret it, we



1 are agreed now that this would only have special and very  
2 limited application to this pipeline?

3 A I wouldn't say it was  
4 limited. In areas of non-permafrost, the objective is  
5 to prevent, along the ditch line, the objective is to  
6 prevent instable soil.

7 MR. SCOTT: All right.

8 THE COMMISSIONER: Well I think  
9 we can stop for lunch. How much longer do you think you  
10 will be, Mr. Scott?

11 MR. SCOTT: I have got two  
12 hours.

13 THE COMMISSIONER: Then we can  
14 start with the Operating and Maintenance panel, and  
15 then perhaps at 5 decide whether we should sit tonight.

16 You might let Mr. Scott know  
17 whether you object to sitting tonight. The objections  
18 really that I'm inclined to take most seriously are  
19 those from the Official Court Reporters, who are having  
20 a terrible time.

21 MR. SCOTT: I hope, Mr.  
22 Commissioner, in view of what happened to me last week,  
23 they won't think that when they let me know that I have  
24 any real power to deal with the matter.

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(PROCEEDINGS ADJOURNED)





(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. SCOTT:

Q Mr. Bauer, in those cases which Mr. Kosten has indicated where you will use the -- where you will pile snow over the cut to prevent, or over the right-of-way to prevent frost penetration, when will this be done, immediately after clearing or later?

WITNESS BAUER:

A It would be done after the ditching.

Q Immediately prior to the ditching, is that it?

A More or less, yes.

Q Mr. Bauer, in your evidence on page 12, question 12, you emphasize the need for cutting and filling to provide a level working surface, and I notice that in the Klohn Leonoff report on slope stability, there are three figures at least, figures 2, 3 and 4, which show side hill cuts alongside the right-of-way.

Now, I take it the process here very simply is to cut -- is first of all, that you have to get a level working surface?

A That's correct.

Q And to do that, you cut into the hill and take that dirt or whatever you get from the cut, and extend it out so you obtain a flat



1 working surface?

2 A Yes.

3 Q And I don't know whether  
4 you're familiar with them but the diagrams in the Klohn  
5 Leonoff report illustrate that in fairly simple form.  
6 Now, the evidence of Arctic Gas and the Northern  
7 Engineering Services and their material, as I understand  
8 it reveals a rather different technique, in which they  
9 will create a working surface, not so much by cutting  
10 and filling, though that may be required to be done from  
11 time to time, but rather by the construction of snow  
12 roads as the working surface? Have I correctly summar-  
13 ized, as you understand it, a difference here?

14 A Well the only time you  
15 would cut into a side hill or a slope if it's unavoi-  
16 dable, in other words, if you must go through that  
17 terrain.

18 Q Well if you don't cut  
19 into the side hill, how are you going to develop the  
20 working surface?

21 A Well that's what I was  
22 just saying. If you have to pass through, in other  
23 words if you cannot go lower or because of the terrain  
24 characteristics, then you have to cut through or cut  
25 into the side slope.

26 Q All right, well what is  
27 generally speaking, the steepest grade or angle of side  
28 hill that you would work on, without making a cut?

29 A I would say on the aver-  
30 age about 4 percent. Now we have got to be careful



1 what side -- if we talk about in the forward direction  
2 or the actual side slope to provide a level surface for  
the equipment.

Q Well I'm concerned about  
the actual side slope.

A Well the actual side  
slope, I say an average of about 4 percent.

Q Yes. Have you at this  
point in time, any estimate at all, or guestimate, as  
to the number of miles of side hill cuts that may be  
required?

A No sir.

Q None whatever?

A Not until our geotechnical  
assessments are completed, or more or less farther

Q Well now, are you able to  
3 tell us whether the cuts and fills that we are talking  
about, will be confined to the 60 foot right-of-way or  
whether they will extend beyond that?

A We will try to confine  
them to the minimum requirements. In other words, I  
would say an average of about 60 feet, where we have  
such tight situations.

Q Well I understand that  
you won't do any work you don't have to, it would be  
imprudent to do it, but I put it that there will be  
many cases where the cutting and filling will extend  
beyond the 60 feet into the 120 feet?

A Not if not absolutely



Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Scott

1 necessary.

2 Q Well there will be cases  
3 where it is absolutely necessary.

4 A But I could imagine,  
5 for instance, on approaches to river crossings or water-  
6 ways crossing, yes that would be applicable.

7 Q Yes. Well now, one other  
8 difference that I want to refer to is heightened by  
9 this question, I think. Following construction, what  
10 do you propose to do with the cut areas that have been  
11 cut in order to provide your working surface?

12 A Do I understand you  
13 correctly? What we do with it afterwards or --

14 Q Yes, are you just going  
15 to leave it there cut, or are you going to fill it, or  
16 are you going to do what?

17 A Well as soon as the pipe  
18 -- the trenching, the pipelining operation is completed,  
19 you have to start immediately with restoration of your  
20 area.

21 Q No, but as I understand  
22 the diagram and I don't want to bother us to get out  
23 the Klohn Leonoff report, but when you are going across  
24 the side of a hill, what you do is, in simplified form,  
25 is you cut a triangle out of the hill to give you a flat,  
26 working surface?

27 A Yes.

28 Q All right. And then you  
29 install the pipe in that flat working surface five or  
30 six feet under the ground?





Mirosh, Bauer, Kosten, Jarvis  
Cr. Exam. by Mr. Scott

A Yes.

Q All right. Now the pipe's installed, now what do you do with that area that you've cut into the side of the hill? Do you just leave it and pass on, or do you restore it, or do you fill it up or

A The area what you cut, you leave there, in other words you make your slope stabilizations.

Q Well is this perhaps an area of difference with Arctic Gas, because I understood from Dr. Harlan's evidence for Arctic Gas, that -- and the reference for my friends is at Volume 39, page 5151 and following, that at least a substantial number of the cuts that Arctic Gas might have to make, and I got the impression that they would be making fewer than you, but leave that aside, that a substantial number of the cuts they would have to make would be filled up

A Well I would say to some degree, where practical, we may do some, but I couldn't say --

Q Well it seems to me that this is a reasonably essential question, particularly if many cuts are going to be made. What is the policy going to be? Is the policy going to be to fill them up again where possible, or is the policy going to be simply to attempt to stabilize the cut that you have created and take erosion measures? Part is more or less applicable.

A I would say the latter



Q And would you agree  
if I've stated Dr. Harlan's evidence correctly that that  
is perhaps the difference between the two applications,  
one of emphasis I agree?

A I'm not familiar with  
Dr. Harlan's evidence.

Q All right.

THE COMMISSIONER: Dr. who?

MR. SCOTT: Dr. Harlan.

Are you trying to put a face to the name.

Dr Harlan  
would you stand up so we can be reminded of you.

MR. SCOTT:

Q Now one other question  
that follows on from that, we asked Arctic Gas this too  
and I'd like to know what you say, with regard to the  
fill that has been brought in, where it has been brought  
in to prepare these level surfaces, what do you intend  
to do with that when construction is complete?

A Well maybe I don't  
follow your question precisely because if you bring  
fill in, that would be only select backfill.

Q What I'm suggesting to  
you is that there are two ways, if you leave snow roads  
aside, there are two ways -- essentially two ways of  
creating a level working surface which you require on  
a side slope. The one is to cut into the hill to create  
the level working surface, and the other is to build out  
from the hill with fill or some material, or a combin-  
ation of the two.



1 A Yes, but it is not the  
2 best pipeline practice to put a pipeline in the fill.

3 Q I'm not suggesting that  
4 you're putting the piping in the fill. Your making for  
5 yourself, a surface from which you can work. Agreed?

6 A Yes you're talking about  
7 more or less a working platform.

8 Q Yes, and you make that  
9 platform by one of two ways or a combination of the  
10 both of them. First, by cutting into the hill, and  
11 secondly by bringing fill and putting it and creating  
12 a working surface?

13 A Right.

14 Q All right, now you've  
15 told me about cuts, when you've finished and got the  
16 pipe in the solid ground, and buried over, what are you  
17 going to do with the fill that you have utilized to make  
18 the construction workingsurface?  
19 Are you going to leave it there or are you going to  
20 truck it away?

21 A Maybe I still can't  
22 follow, because if you import fill then in most cases  
23 you utilize it for backfill anyway.

24 Q Well, this sketch is so  
25 extreme as to be absurd, but perhaps you could look at  
26 it first, I show you a slope that is so steep that you  
27 will immediately look for another location of your  
28 route.

29 A Right.

30 Q But leaving that aside,



1 and I'll show this to the Commissioner in a moment.  
2 if you're going to try and go along the edge of that  
3 slope, if you're trying to go along the edge of this  
4 very extreme slope, I know you wouldn't, but if you  
5 were, or if it <sup>modified</sup> was, you want to get a level working  
6 surface, first of all between 60 and 120 feet?

7 A Right.

8 Q One way to do it is to  
9 cut out from the hill and get a flat surface, correct?

10 A Yes.

11 Q Another way is to build  
12 up a surface on the side of the hill. We've heard from  
13 Arctic Gas about that, particularly in connection with  
14 snow roads. But that's another way, it's exaggerated  
15 on the diagram. All right, you then have your flat  
16 working surface, of the appropriate dimensions, you  
17 dig your trench and you put your pipe in it. And your  
18 pipe is in the side of the hill. Now, you've told us  
19 what you will do about that cut in order to stabilize  
20 it, what are you going to do about the other material  
21 here in those cases where you have obtained it in order  
22 to make the platform.

23 A In those cases, because  
24 you have to go through elaborate preparations, by  
25 compacting it and so on, you leave it right there.

26 Q You leave it right there?

27 A Yes sir.

28 Mr. Scott: May I tender this?

29 THE COMMISSIONER: Yes.  
30





Sketch of side of hill  
marked as exhibit 263

THE SCOTT:

Q I want you to envisage and perhaps this is for Mr Mirosh or Mr. Kosten, the possibility that this line will be looped.

WITNESS MIROSH:

A Yes.

Q And you've already told us that a substantial amount, I think you said half the line in places will have to be blasted, I take it that when looping occurs, it is likely, unless new techniques are developed, that blasting will have to be done again.

A Yes

MR. KOSTEN:

A That is a fair statement, yes.

Q Now, is there any rule of thumb or indeed regulation about the distance the two pipes must be, one from the other when there is blasting required?

A The particular situation you're describing in permafrost, I don't know what the distance specifically would be. The normal practice for instance in rock where you encounter blasting can be as little as ten feet as a specification. It's sometimes more, it depends on how the particular company installing it views the---

Q Well Mr. Kosten, what would you regard as prudent in terms of blasting in permafrost?

A For the double line?

Q For the distance between



the two?

A This is an opinion only  
sir, I would think possibly 15 to 20 feet.

Q Well now does the panel  
know and Arctic Gas again was asked this, how much  
additional right of way or construction area beyond  
120 feet they will acquire in the event that the line  
is looped?

WITNESS MIROSH:

A Probably no more than  
10 or 20 feet, except for the extreme example which you  
have shown us.

Q Well would 15 feet be a  
fair average? Or 20 feet, which do you prefer?  
If you say ten feet now they may only give you ten feet  
in five years so maybe you better say 20, don't you think?

A Ten to 20.

Q All right. So what we  
know then is that when we come to loop the pipe has to  
be -- the new pipe has to be a certain distance from the  
other, perhaps 15 feet and you will need, let us say,  
15 to 20 feet additional in order to lay it, is that  
fair?

A Yes, that may be.

Q Now, in your application  
and I'll just give the references so that we will be  
able to refer them to them when we look at the record,  
you show a configuration for working on the mainline  
as figure 3D-2.1 and figure 3D2.-2 and then you show  
a mainline right of way configuration at tie in of two



1 spreads and that figure 3D-2.3 and before we come to  
2 it I understand that unlike Arctic Gas, your crews as  
3 they work, as number 8 spread is working and number 9  
4 spread is working, they will be working towards each  
5 other, is that correct?

6 A Yes, some spreads will.

7 Q Isn't that true of I  
8 think all of them? That you put your construction  
9 camp in the middle of the spread, and you work away from  
10 it, as opposed to Arctic Gas's method which is to begin  
11 at one end of the spread, and work either out or in?

12 A I think that's generally  
13 true, yes.

14 Q All right, now figure  
15 3D -2.3 is what happens when the -- when spread eight  
16 comes to meet spread nine. And the configuration takes  
17 account of the fact that the working surface in spread  
18 8 and spread 9 will be on different sides, isn't that  
19 correct? In one it will be on the east side and one  
20 it will be on the west side?

21 A Yes.

22 Q And the result of that is  
23 that there will be have to be a kink in the line so that  
24 the line joins up?

25 A Yes, a bend.

26 Q And that's shown, do you  
27 hve it in front of you on figure 3D2.3.

28 A We don't have that  
29 exhibit here.

30 Q Mr. Hollingworth has it and



1 perhaps I can show it to you just so you can identify it.

2 That's a typical join between two spreads?

3 Now Mr. Mirosh, what I would like to ask you to do, not  
4 today, but I asked Mr. Williams the same thing and he  
5 did, which will be an inducement to you, is to prepare  
6 a configuration based on that, which will show how the  
7 looping will be achieved. at that particular location.

8 A Okay.

9 Q I would appreciate it if  
10 you could do that for us.

11 Well now, let me come to  
12 summer construction. I take it from what you said  
13 earlier that you were only considering summer construction  
14 of one spread as a possibility at the moment

15 A Yes, that's right.

16 Q Does the proposal for two  
17 winter construction years that you have put forward, take  
18 account of all spreads being done in the winter?

19 A Yes, it does.  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30





Q When do you anticipate  
that you will know whether a summer spread will be  
appropriate?

A Well I think we have to be  
in the field a little more, although our assessment  
currently is that there is terrain in the area of the  
spread which we have mentioned, which is very much like  
terrain in Alberta.

Q And that's the spread  
that covers Willowlake River, I think?

A Yes, I think it's in that  
area.

Q Up to Blackwater River.  
I have identified it, I hope correctly, as spread  
number 6.

Now --

A I think that's right, I  
believe it's in the Wrigley vicinity.

Q Now apart from economics,  
is there any particular justification for a summer  
spread?

A Only that if there is no  
environmental damage which could occur, it would be  
reasonable to do some work in a different time frame  
than the winter.

Q Well I understand that  
but I take it that the principal virtue of a summer  
spread is it leaves you more winter time to do the  
other work?

A Well, that is --



Q It saves equipment. It utilizes --

A There is a cost factor involved. There could be a saving.

Q Well let me ask you this: Do you know of any, at the moment, of any environmental or socio-economic, and I am not talking about your socio-economics, I am talking about the Territories' socio-economics, of doing a spread in the summer, any advantage?

A Well it would provide work over a longer period of time for people in the area.

Q Apart from that, do you know of any other advantage?

A There would be more of a training period involved, which would benefit those who are newly introduced into the project.

Q Anything else?

A Yes, there would be -- certainly there would be better weather conditions, more daylight which would probably allow a better productivity.

Q I place those, if I may, as all economic advantages. Can you tell me any environmental advantage that will accrue?

A Well I think the clearing operation would be easier to carry out.

Q But the clearing operation is going to be performed in the first winter, isn't it?

A Yes, that's right, but if



we --

Q So it will already be  
done?

A That's true, on the basis  
that we have put forward of winter construction, but if  
we put forward a summer pipeline job it would be reason-  
able to us to put forward summer clearing in that area.

Q Can you think of any  
environmental advantage at the moment? Well let me  
put another question that perhaps is fairer. Are your  
environmentalists considering this possibility?

A Well we haven't put this  
to them yet because we are still considering it in the  
engineering area, and we're not certain if we want to  
put this forward to them yet.

Q I see. Well now, from  
the bar chart or whatever it is called, the construction  
schedule, 3D1.1, it's a little hard to tell, for me at  
least, whether there is -- leaving the summer construct-  
ion project aside for the moment -- whether there is any  
work that will be done in the summer months. Can you  
help me with that?

A Yes, there will be a great  
deal of stockpiling and logistics movements, primarily  
on the river and close to it during the summer months.

Q Can I ask you some ques-  
tions and see if it's likely that any of this will be  
done in the summer, with respect to the project that you  
now put forward? How about the opening and development  
of borrow pits?



A That might be possible if we had a permanent access into the borrow pit, but in many instances we have indicated on our applications -- on our application documents that these would be winter roads, but there are some that do have permanent roads either existing or that we may propose.

Q How about rock excavation?

WITNESS KOSTEN:

A I wouldn't envisage that being done in the summer, sir.

Q And I think we dealt with clearing, and apart from the summer possibility, it's going to be done in the winter, is that correct?

WITNESS MIROSH:

A Yes.

Q How about concrete weight fabrication?

A Yes, that could be possible.

Q Will that be done on the construction pads?

A We have allowed for those operations to occur at staging areas.

Q And I take it that restoration and revegetation may be done in the warm weather? Some of it may have to be done in the warm weather?

A Yes, it could be.

Q How about work at river crossings?

A Yes, the two major crossings of the Mackenzie we have proposed as summer





1 crossings.

2 Q How about -- any others,  
3 or just those two?

4 A There may be others but  
5 those two are the two we put forward now.

6 Q How about compressor  
7 station construction?

8 A Yes, after the pad is in  
9 place, and access roads are installed, that would certainly  
10 be carried on all year round.

11 Q Well let me come to some  
12 other questions which, it is Mr. Mirosh's fault I have  
13 to ask today, because on the compressor station panel  
14 he deferred them to this panel, and I'm glad to see he's  
15 on both.

16 First of all, have you any  
17 plans for controlling run-off and drainage on construct-  
18 ion pads that will be utilized in -- on the route?

19 A On the pads themselves?

20 Q Drainage from the pads?

21 A Yes, this would be taken  
22 into account in addition to the disruption which the  
23 pad offers to the normal drainage course.

24 Q Well are you aware of any  
25 of the problems that have occurred on the Alyeska line  
26 in respect to drainage from pads?

27 A Are you referring to the  
28 work pad along the pipeline, or station pads?

29 Q The station pads?

30 A No, I'm not aware of any.



Q Well now, you deferred until this panel, questions related to sewage with respect to construction, as opposed to compressor station operation. Are you going to have sewage lagoons at these construction pads?

A Yes, this is something, of course, we have had a chance to discuss briefly in the interlude. There are plans, we have-- I'm advised that we have planned on a requirement for an additional sewage lagoon, which we haven't shown on the drawings since the one shown on the drawings is sufficient only for an operations phase.

Q So do I understand that the construction pad will basically have place for two lagoons; two of them to be utilized during the construction period, one of them to be utilized during the operations period?

A I'm advised that the way our people are approaching this is that the expansion area, which Mr. Marshall brought up, would likely be a sewage lagoon during the construction phase, and in the event of looping, would be filled in for expansion.

Q And I take it that when it's filled in for expansion, another lagoon will be taken in the next expansion area?

A Well the manpower requirements will not be as large during a compressor station expansion, and it would depend on the amount of pipeline looping going on at the time.

Q Yes. Well then it would



not be right of us to regard this expansion area as area that will not be touched, it will as you presently indicate, be the location of the construction sewage lagoon?

A Yes, I'm advised that that is true.

Q Are you going to use packaged treatment plants of any kind during construction?

A Yes, but I haven't determined the type.

Q Can you tell me the size of this sewage lagoon, the construction sewage lagoon?

A Yes, it would be about 700 feet by 100 feet or dimensions that give that area.

Q What depth?

A Five feet.

Q Do you know anything about the retention time of sewage in the lagoons, or have you got that far?

A No sir. These details are being worked on by a consultant who is reporting to our environmental people and I haven't seen the report yet.

Q Who is the consultant?

A Associated Engineering Services Limited.

Q When will that report be available, do you know?



A. I would suspect fairly soon,  
and I would qualify that by saying within weeks or a  
month.

Q Well I had a lot of  
questions on sewage and I think you've just foreclosed  
most of them and I'd better wait for that report. I  
take it that you will let Mr. Hollingworth have it as  
soon as it's available?

A Yes.

MR. HOLLINGWORTH: I think we  
have already undertaken to produce it.

MR. SCOTT: Well that may be.  
I take it that consultant will also make a report with  
respect to -- if I can call it this, non sewage garbage  
is that fair?

A Yes, the scope of his  
assignment, as I understand it, is both the sewage  
lagoons and incineration, and solids.

Q Well now, I want to you  
ask you a question or two, as we did of Arctic Gas, about  
testing techniques and bending. Do I understand that  
bending will be done with bending machines that are  
equipped with internal mandrels?

A Yes, I believe that's  
Mr. Bauer's testimony.

Q And would I be correct  
in concluding that the use of mandrels leads to the  
deposition of oil or residues within the pipe?

A I can't think of a signifi-  
cant amount of oil that would be involved.

Q How about hydraulic oil?

A If there was a leak, this  
would be possible.





Q Have you done any studies as to the results in terms of residue from this bending technique?

A No, this is normal bending technique.

Q I recognize it's normal bending technique, but are there residues in the form of oils that are produced from it.

WITNESS KOSTEN:

A There could be I don't anticipate there would be significant amounts of it, Mr. Scott.

Q How about a pound a mile would that be fair?

A I could offer no judgment on it but I've seen bending operations and this has never been raised as a problem.

Q Well now --

A I can't give you a specific answer on that.

Q Alright, well let's come then to testing. I take it there will be a number of modes of testing the pipe, is that correct?

WITNESS MIROSH:

A Yes, we have put forward the water methanol solution to testing but we do anticipate that warm water techniques may be used in some areas.

Q Well let's talk about weld testing. I take it visual inspection is the obvious first one, in the case of welds

A Yes, well the inspection



process goes right back to the mills if you wanted to start to get into it.

Q Let's not go right back to the mill, but on the ground, you would also utilize radiographic and ultra sonic techniques?

A Yes.

Q And then with respect to the pipe, you would utilize warm water methanol?

A Well in the case of water methanol, it wouldn't necessarily be warm, but if it was only water, it would be a warm water.

Q So it's really an alternative. Water methanol or warm water?

A Yes.

Q Have you developed any plan, as yet, for the disposition of any residues or the photographic film that will be utilized or the chemicals that will be produced, as a result of the testing techniques?

A Well we haven't formulated a plan but there will be a great deal of barges dead-heading south from the logistics program. Removing materials which are used will be possible on these.

Q What I'm asking is that Arctic Gas set out a fairly extensive scheme for the isolation, I thought it was fairly extensive at the moment, for the isolation, of these residues and for containing them or diluting them adequately and getting rid of them. First of all, have you read what they say about these things?



1 A Which residues are you  
2 referring to?

3 Q All of the residues from  
4 hot water, from warm water testing, the residues from  
5 the methanol technique.

6 A Yes, well in the case of  
7 methanol, we have allowed for distillation of the  
8 water methanol solution, and we have again, considered  
9 the storage of the resulting methanol into the barges.  
10 Then the possibility of shipping the methanol south  
11 to be used either in a manufacturing process or the  
12 possibility alternatively of burning it either to  
13 atmosphere or the ultimate possibility of using it as a  
14 fuel for the fueling of electrical generators or --

15 Q I'm anxious to concentrate  
16 on the differences. What I'd like to ask you first,  
17 is have you read what Arctic Gas says they are going  
18 to do in these matters?

19 A I've read a great deal  
20 of parts of the Arctic Gas document, over the last  
21 several months.

22 Q Do you have any  
23 differences of opinion with them in this area?

24 A I think they're proposing  
25 distillation as well. I'm not sure but I recall what  
26 the disposition of the methanol will be, according to their  
27 application.

28 Q As I understand Arctic Gas  
29 they were going to distill it down to one percent and then  
wash it into creeks. Is that your understanding.



1 Mr. Marshall's going to correct  
2 me.

3 MR. MARSHALL: Your under-  
4 standing may not be complete, Mr. Scott.

5 MR. SCOTT: I find that very  
6 difficult to believe, Mr. Marshall. Perhaps you can  
7 tell me --

8 MR. MARSHALL: I don't Mr.  
9 Scott.

10 MR. SCOTT: Perhaps you can  
11 tell me how I've stated it wrong.

12 MR MARSHALL: The evidence went  
13 on at some length and I can't really give you a complete  
14 summary but as I understand it, there were different  
15 aspect of it. One would be distillation of it to  
16 such a level that it's considered environmentally  
17 acceptable to discharge it into a water course. Another  
18 would be a burning technique, but the evidence was  
19 fairly long and detailed on this subject and I really  
20 can't give you a complete summary off the top of my  
21 head.

22 MR. SCOTT:

23 Q Well Mr. Mirosh, perhaps  
24 we could deal with it this way. Could you, at your  
25 leisure, read the Arctic Gas evidence in this matter,  
26 or formulate for us your proposals in writing, with  
27 respect to the disposition of these materials.

28 A Yes, I think we have  
29 touched on that in the application, where we do state  
30 that the distillation will be down to either one half or





1 one percent, I don't recall which. The disposition of that  
2 fluid, either I can elaborate on it as you've  
3 suggested, or I believe it's being handled in the  
4 environmental panel.

5 Q Well my problem is that  
6 I would like to know about it before the environmental  
7 panel, that's why I'm asking you now so I can get some  
8 advice about it and I'd appreciate it if you could let  
9 Mr. Hollingworth know what is proposed as soon as con-  
10 venient.,

11 A Yes, well currently we  
12 have proposed dilution of the half percent solution  
13 sufficiently so that it can be placed into water  
14 courses without damage to aquatic life.

15 Q Are you going to do any  
16 double jointing?

17 A Well the pipe will be  
18 coming out of the mills at roughly 70 foot lengths and  
19 that's the length it will be streamed at.

20 Q Is the answer then no?

21 A Unless we have shorter  
22 joints then we would consider double jointing.

23 Q The reason I ask of  
24 course, is that as I understand it, if you double joint,  
25 you have to do half as much welding because you've double  
26 jointed?

27 A No, you would normally  
28 double joint shorter sections of pipe, which might be  
29 35 or 40 feet long to make them 70 or 80.

30 Q All right, well if your



product at the staging area is a 70 foot pipe, I take it you won't be doing any double jointing of the 70 foot pipe?

A Right.

Q Now, something about restoration, again, I want to ask these questions now so we will know what to contemplate when the environmentalists give evidence, in later phases. What you're going to have on the mainline as I understand it, is after the second winter, half of the mainline will be completed with its mound, after the third winter, the other half will be completed with its mound, right?

A Yes.

Q All right, now when are you going to begin revegetating those portions of the pipe?

A Well we would likely begin some revegetation right after clearing if we had cause to carry out grading on slopes but if you're referring to the ditch line, this would be done the summer after the winter's construction.

Q So the second winter, when you've completed half the line, that summer you will begin to revegetate that half?

A Yes.

Q When are you going to revegetate?

A What time of the year?

Q Well what time in the summer? Are you going to revegetate in the summer, the



1 spring, the fall, what month?

2 A Well I'm not a farmer  
3 but I suspect we do it in the spring.

4 MR. HOLLINGWORTH: Mr. Gibbs  
5 isn't here to answer that.

6 MR. SCOTT:

7 Q Well what I'm concerned  
8 to know is I could guess that you would do it in the  
9 spring, I mean I'm not a farmer either, but-like Mr.  
10 Gibbs but I happen to farm a small piece of land and  
11 that's when I plant seed, but is that what you intend  
12 to do or do you intend to do it in the autumn or is it  
13 simply that you don't know?

14 A Well revegetation is  
15 something that the engineering phase has not been  
16 looking at but we do have consultancy in that area,  
17 which will be put forward during the environmental  
18 panel.

19 Q Well I would like to know  
20 now. if it can be arranged, or as soon after this panel  
21 as can be arranged, I regard it, and I hope you don't  
22 differ with me, as part of the construction program.  
23 An integral part of the construction program and what I  
24 would like to know, because it does make a difference,  
25 whether the revegetation will commence in the spring,  
26 or be delayed until the summer or be done in the autumn.  
27 Now we'll have phases 2 and 3 but as a construction  
28 technique, when do you intend to do this?



1                   A    Well after clean-up of  
2 the right-of-way is complete, revegetation, seeding and  
3 fertilizing would occur. Now, that I'm sure would be  
4 in the spring.

5                   Q    Well let me ask you this.  
6 I take it you're not aware of any construction reason  
7 why you wouldn't be able to revegetate in May or June?

8                   A    No, I agree it's part of  
9 the construction process but we do have to get advice  
10 from the specialists in that area.

11                  Q    Well do you agree with my  
12 suggestion that there is no construction reason why you  
13 cannot revegetate in May or June?

14                  A    Well I can't think of any.

15                  Q    All right. What reveget-  
16 ation procedures are you proposing to use on slopes?

17                  A    I think all I can say  
18 there is the installation of seed and fertilizer  
19 by helicopter.

20                  Q    Well, I don't want you to  
21 guess, and I'm sure you're not. I just want you to tell  
22 us what you know, and is that what you know is going to  
23 be done or is that just a guess?

24                  A    Well again I would defer  
25 revegetation details to those expert in that.

26                  Q    Well I am not going to  
27 press you for it now, but I would be grateful if you  
28 would let Mr. Hollingworth know what the procedures  
29 you contemplate in terms of construction and when you  
30 proposed to do them with respect to the completion date





1 of burial?

A Yes, we can do that.

Q Well with respect to  
4 revegetating on the mound or on the cut, and on the  
5 slopes, I would like to know what procedures are  
6 intended and when they are intended to be done in terms  
7 of the construction program?

8 Now in question 18, at the end  
9 of the second paragraph, you go a little further and you  
10 say -- actually it is Mr. Kosten's evidence, "It is  
11 anticipated that possibly some restoration measures may  
12 be required in the fourth season as well". Now I take  
13 it, Mr. Kosten, does that refer to the -- that does not  
14 refer to the summer following the second main line  
15 construction season, but refers rather to the summer  
16 succeeding that, does it?

17 WITNESS KOSTEN:

18 A I believe that was the  
19 implication there, yes.

20 Q Well perhaps, Mr. Mirosh,  
21 if you don't have that at hand now, you can let me know  
22 through Mr. Hollingworth again, precisely what those  
23 restoration measures are and with a little more precision  
24 when they will be done in terms of the construction  
25 plan?

26 WITNESS MIROSH:

27 A Yes, well I think if I  
28 can read that statement correctly, it would take care  
29 of any stabilization and erosion control methods and  
30 revegetation that did not succeed in meeting our



expectations during the earlier year.

Q Well if then you are simply going to repair devices that didn't work before, but which were installed, that's one thing, but if you are contemplating something else, I would appreciate it if you would let us know in due course?

A Yes.

Q Now you raised drainage control and erosion protection devices to be installed. When are they going to be installed, at the time of clean-up or during the first summer, or immediately prior to revegetation or when?

A Well if again we carry out grading during the first season after clearing, then some of these methods would be applied at that time. In areas that we didn't do this, they would be applied after pipeline construction. In areas where they were applied earlier, but we continued construction later, they would be reapplied.

Q The trouble I'm confronted with is as good pipeline people, you have been very precise about the sequence and timing of the preparation of the right-of-way, the insulation of the pipe and so on. If I may respectfully say so, you have been a little less precise about the timing of these erosion control devices and revegetation, and perhaps if you get any more precise knowledge as to when in the construction program, with precision, these will be installed, you could let Mr. Hollingworth know again.

A Yes.



Q We would like to know  
that before phase 2-3.

Now Mr. Jarvis -- was it Mr.  
Jarvis -- it was Mr. Mirosh's evidence at question  
number 6 on page 6, and there you were asked about aside  
from barging, do you see any other means of transport-  
ation along the Mackenzie Valley? And you say, "Yes,  
we are contemplating the use of an existing winter road  
which stretches from Fort Simpson to Inuvik", and I take  
it that that would provide a main artery that would run  
essentially the length of the pipe -- it isn't adjacent  
to the pipe -- but relatively adjacent to the pipe,  
that would be the winter equivalent for your project  
of the highway?

A Yes, it could be.

Q And that in that sense  
then, it is in winter terms, the -- an important trans-  
portation artery that you will utilize?

A It would be supplementary  
to the helicopters.

Q Yes. Well, I take it  
that you would propose in the winter to use this winter  
road reasonably extensively?

A Yes, I think it would see  
a reasonable amount of use, particularly during the early  
phases of the project, when we wanted to move materials  
up the -- down the valley, I should say, and this road  
would complement the Mackenzie River certainly to a  
large extent.

Q I take it that



1 it would also ease taking out people and putting them in,  
2 and so forth?

3 A It could assist that way.

4 Q I was working out yester-  
5 day how long it would take your helicopters to get out  
6 all these people, and I may have figured it out wrong,  
7 but I worked it out to about 10 days of 10 flights each.  
8 But that may be wrong.

9 In any event, I take it that  
10 the winter road is going to be a substantial -- of sub-  
11 stantial use to you?

12 A Yes, it could be.

13 Q And indeed, you're counting  
14 on it?

15 A Well we are contemplating  
16 it.

17 Q Well you are contemplating  
18 it because you're counting on it, you say so?

19 A Well it certainly will  
20 assist us and we would like to see it there because it  
21 will ease the whole project, but --

22 Q Are you going to have two  
23 helicopters per pad?

24 A Per spread.

25 Q Per spread. Well I take  
26 it that with two helicopters, and you're using the  
27 biggest Sikorski's --

28 A No, I think we are using  
29 what I have called a smaller heavy lift machine.

Q Well who is it made by?





1 A It's a Sikorski S-61, is  
2 one of our proposals.

3 Q All right, the S-61, I  
4 know what we are talking about.

5 A I think there are larger  
6 ones than that.

7 Q All right, and I take it  
8 that with that helicopter assistance, and no doubt it  
9 will be extremely useful, nonetheless the winter road  
10 becomes an important transportation corridor for you?

11 A Yes, it could be.

12 Q And without it you would  
13 be in some difficulty? In terms of moving supplies  
14 and people and all the rest of it?

15 A Well I think with it we  
16 would be a lot easier off.

17 Q Won't you go that little  
18 bit much further with me and say that without it you  
19 are going to be in some difficulty?

20 A Well we have certainly  
21 prepared our plans on not counting on it, but if we  
22 count on it, it would likely change our logistics pattern  
23 to the betterment for us.

24 Q DO I understand from that  
25 that you are counting on it?

26 A No, I think what I'm  
27 saying is that if we were able to move a fair amount of  
28 tonnage on this road, which we certainly hope we can do  
29 and it has shown or demonstrated that it can do this,  
30 then we would likely reduce the number of barges that



1 we would require.

2 Q Well I am delighted that  
3 you are not counting on it, because I'm instructed that  
4 it's not there. When did the winter road last go to  
5 Inuvik?

6 A Well it may not have been  
7 up there last year, but it has been up to Inuvik five  
8 years ago, six years ago and I'm not sure how many  
9 years.

10 Q Well my information, Mr.  
11 Mirosh, and see if you know anything about this, is that  
12 they built it in 1970 or thereabouts, and -- to Inuvik,  
13 and they found out it was simply uneconomic and they  
14 haven't built it since.

15 A Well it's a function of  
16 the tonnage that you put on it. It was economic, as I  
17 understand it, when there was a lot of drilling activity.  
18 It hasn't been economic for the last few years.

19 Q Well that, you see, is  
20 why I am trying to get you to agree with me that you  
21 are going to need it, because then if you say you need  
22 it, maybe there will be a winter road to Inuvik. If  
23 you say you don't need it, I suspect there won't be.  
24 Now, you need it, don't you, under this plan?

25 A Well we need it to the  
26 degree that it would assist us.

27 Q I think we had better  
28 call that little exchange a draw. I am flagging.

29 Well have you --

30 THE COMMISSIONER: It reminds



1 me of something MacKenzie King once said.

2 MR. GENEST: About conscription,  
3 we all remember it in French Canada, sir.

4 MR. SCOTT:

5 Q A winter road is neces-  
6 sary, but not necessarily a winter road?

7 Well have you talked to the  
8 people who run these things about putting in a winter  
9 road? Are they going to do it for you?

10 A We have talked to the  
11 company that has operated this winter road in the past,  
12 and they certainly would like to see us utilize it.



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1 Q You agree with me that  
2 for the past five or six years it's only gone to Norman  
3 Wells or to Fort Good Hope in a good year?

4 A I know that it hasn't  
5 extended the full way to Inuvik the last few years, but  
6 I also do know that it has gone that far during the  
7 early years of its opening when there was a lot of  
8 exploration activity.

9 Q I don't understand for  
10 the life of me why in question 6 you refer to it as  
11 an existing winter road. You tell me now that you know  
12 it hasn't been there for five or six years. Can you help  
13 me with that. Have you got some promise that it will  
14 be built?

15 A Well it's built every winter  
16 that it's in use all the way up.

17 Q Now Mr. Jarvis, let me  
18 ask you just one question about winter roads adjacent to  
19 the project, apart from this Crystal Palace Highway we've  
20 been talking about. You've told us, my winter road expert,  
21 Mr. Goudge is not here so I can't ask him questions about  
22 it generally but you've told us about how it's going to  
23 be built and how it's going to be used, are you aware of any  
24 studies that have been done about the use of -- about the  
25 environmental impact of a winter road that is constructed  
26 and reconstructed over three or four years, in the same  
27 location?

28 WITNESS JARVIS:

29 A I'm aware of a report  
30 on that. It is -- it refers to an examination of the





1 test road facility at Inuvik, but that is only one year  
2 of experience.

3 Q Yes, well let me see if  
4 you can help us as a matter of judgment on this, obviously  
5 a winter road that is built adjacent to the pipeline and  
6 used for one year may or may not have environmental  
7 consequences, depending on how its used and when it's  
8 begun and when it's ended, isn't that fair?

9 A Yes. that's true.

10 Q All right, well what do  
11 you say about the situation in which a road is used  
12 for three or four years, over the same location.  
13 Can you go on indefinitely without environmental impact?

14 A I don't think you can --  
15 I could say that there was no environmental impact, that  
16 that would be incorrect. But I believe that if the road  
17 is properly constructed, and maintained, and you don't  
18 push the use of the road at either end, that that effect  
19 would be minimal and observations of roads in similar  
20 areas would indicate that that's the way it is.

21 Q Yes, but you I think have  
22 agreed that there has been no study done about the impact  
23 of a snow road that has existed for more than one year  
24 in the same location.

25 A I don't know of any  
26 formal study. I know of personal observations of that  
27 situation.

28 Q Aren't we into a situation  
29 where what is contemplated is a snowroad, that will exist  
30 for three or four years, in the same location, and which



1 will carry a very large amount of trucks and so on.

2 It's a special case if ever there was one.

3 A It is a special case  
4 in the scale of operations and the number of passes that  
5 are contemplated.

6 Q Well Dr. Fyles suggests  
7 to me that that is such a novelty, the road in the same  
8 place, over three or four years, with heavy tonnage,  
9 that it almost requires an impact assessment of its  
10 own bearing in mind what we know. Would you agree with  
11 that?

12 A You may be correct in that  
13 assumption, yes.

14 Q Well now, I asked Mr.  
15 Horte about this and perhaps Mr. Mirosh can tell me,  
16 what about the Mackenzie Valley Highway, to what extent  
17 do you depend on that?

18 Weight your words carefully.

19 WITNESS MIROSH.

20 A Well I think we have shown  
21 cases in the application in the location section, the one  
22 that we have counted on, is the highway up to either  
23 Wrigley or River Between Two Mountains I forget which.  
24 The other case was the highway being constructed the  
25 full way, and we showed in that section what access  
26 roads we need in either case

27 Q But I take it that you  
28 agree with me that as a prudent planner, you can't  
29 count on the highway beyond Wrigley?

30 A That's true at this stage.



1 in time, yes.

2 THE COMMISSIONER: Just a  
3 moment, the highway is not to be completed to Wrigley  
4 until 1979. That is the Minister's latest announcement.  
5 Unless I'm slowly losing my mind --

6 A That's correct.

7 Q Now, at the moment all  
8 you can count on is a highway that takes you to Fort  
9 Simpson as I understand it or 30 miles beyond.

10 A Yes well we do have  
11 two or three, a couple of years.

12 Q The people of  
13 Wrigley they made it  
14 clear that they're not all together pleased about  
15 the prospect of a highway coming to Wrigley in -- even  
16 in 1979. It seems to me you're -- unless your plans  
17 are based on using it only after completion, which  
18 presumably would mean you couldn't use it until the very  
19 late 70's or the 80's

20 MR. SCOTT:

21 Q Well what about it, Mr.  
22 Mirosh?

23 A Well I think we'd use it  
24 to the furthest extent that it is complete.

25 Q What are you going to do  
26 if it doesn't get beyond Fort Simpson?

27 A We'll have to adjust our  
28 plans. Right now we have allowed for the highway  
29 being up to River Between Two Mountains which is not  
30 far from Fort Simpson.

31 THE COMMISSIONER: Well Piver



Between Two Mountains is an awful lot closer to Wrigley than it is to Fort Simpson, and I saw the highway there a few weeks ago. You Won't get through there for a while. However that's --

MR. SCOTT:

Q Let me turn to something else. In Section 5D510 of your --

THE COMMISSIONER: I saw the highway under construction there. that's what I mean I'm sorry, I --

MR. SCOTT:

Q I'm sorry, 5D 510, you deal with your policy respecting environmental education and enforcement of environmental policy. 5D510.

Now, you've had a chance to have a brief look at this and the language is worthy of the signors of the Declaration of Independence. I'm not sure it tells me very much and I'd just like to see if you can give me one or two precise answers about what you intend to do apart from general statement that you intend to do everything necessary. For example, how many environmental inspectors do you propose to hire?

A This has been discussed but the environmental panel, would be far better to provide you with answers.

Q I need them before the environmental panel. Arctic Gas was able to tell us what they were proposing to do and withstood a good natured jostling on account of it. Now what do you intend





1 to do?

2 A I think I could get  
3 you that information following a phone call with our  
4 environmental people.

5 Q I'd appreciate it if you  
6 would and I'd also like to know where they're going to  
7 be located. Are these going to be line people, or  
8 are they going to be office people in Yellowknife  
9 or Calgary, I would also like to know what disciplines  
10 are going to be represented, and the appropriate volumes.

11 A I think I can give you  
12 some of those answers here since I do recall carrying out  
13 these discussions recently with the environmental people.

14 Q Well Mr. Mirosh let me  
15 interrupt you. I don't want you to make a guess if it  
16 subsequently turns out that it's mistaken. I don't want  
17 you to say ten and then when Phase II comes along say  
18 oh no, Mr. Mirosh didn't know what he was talking about,  
19 we're going to have 30. I want your precise estimate  
20 at the moment. Now if it takes a phone call to get it  
21 you can give it to us later either here or through Mr.  
22 Hollingworth. But you'll understand that the information  
23 will be no good to us if it's just a guess at this stage.

24 A Yes, I can give you the  
25 numbers after a phone call, but in answer to your last  
26 question, there will be environmental people in the field,  
27 on the spreads, there will also be environmental people  
28 in the district offices, which will be spread offices  
29 during construction.

Q Well perhaps I'll leave that



1 with you because I do need a little more information than  
2 that as to who they will be in terms of discipline and  
3 where they will be placed.

4 A I think I can also give  
5 you the disciplines. There would be, I know an  
6 archeological inspector, --

7 Q One for each spread?

8 A Yes, as I understand it,  
9 and I can confirm this by the phone call. There would  
10 be a biological type of inspector.

11 Q One for each spread?

12 A Yes. Subject to confir-  
13 mation again.

14 A geotechnical inspector.

15 The plans are to have these people on the spread reporting  
16 to people in the district offices which in turn would  
17 report to people in the head office.

18 Q Are these going to be,  
19 when you say a geotechnical or biological inspector,  
20 are these going to be geotechnicians and biologists or  
21 are they going to be other persons working for geo-  
22 technicians and biologists?

23 A They will be geotechnial  
24 engineers in the case of the geotechnical people, or  
25 well qualified technicians. They will be persons with  
26 adequate university training, in the biological sciences.

27 Q And would you also let me  
28 know, either now or when you can, with what precision you  
29 can, as to their powers in the field and the specific  
30 power, I'm concerned about, is their power to stop the work



1 A Yes, we have discussed  
2 this to some degree, our approach would be that the  
3 field people would attempt to resolve differences and  
4 problems in the field amongst themselves. in the event  
5 that there is an unresolvable situation, this would be  
6 required to be handled at the district office amongst  
7 those people. If this isn't resolved there, it would  
8 go on up.

9 Q I'm concerned about the  
10 time lag involved in that procedure and I think if I  
11 have it right, Mr. Horte indicated to us, for Arctic  
12 Gas, that the technical people, that is the geotechnicians  
13 and biologists that he proposes to put as inspectors in  
14 the field, will in the case of a dispute that is un-  
15 satisfactory resolved, have the power to stop the  
16 work?

17 A Yes, we've discussed these  
18 possibilities.

19 Q Are you going to do that?  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30



1                   A     There probably will be  
2     some very quantifiable situations where this will happen,  
3     but we would have to write the scenarios for these.

4                   Q     Well, as I understood Mr.  
5     Horte's evidence, and I don't have the reference to it  
6     right now, he dealt, as you did, with the expectation  
7     that in most cases the engineers, the construction people  
8     and the environmental inspectors will by either discuss-  
9     ion or negotiation, come to an agreement.

10                  A     Yes.

11                  Q     And that's the optimum case.  
12     He also dealt, at our request, with the other case in  
13     which no agreement was possible without compromising  
14     what the biological inspector regarded as an important  
15     interest, and he told us that in order to -- as I under-  
16     stand his evidence -- in order to permit the matter to  
17     be resolved on a higher level, that biological inspector  
18     would have the power to stop the work, and that that  
19     would be written into the construction contract.

20                  A     Yes, we have discussed  
21     this possibility, but there would have to be some guide-  
22     lines associated with that.

23                  Q     Well as a matter of  
24     principle, do you recognize that what I have suggested  
25     is a desirable thing?

26                  A     Yes, it may be required.

27                  Q     Do you see any impediments  
28     to it that can't be resolved?

29                  A     Well the impediments might  
30     be if improper guidelines were given to the people that





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1 they might be shutting down operations indiscriminately,  
2 we would want them to adhere to their guideline require-  
3 ments to protect whatever interest their area is in,  
4 but to spell it out such that they know exactly when  
5 they can act like that.

6 This whole question is currently  
7 being studied by our staff.

8 Q I take it then that at  
9 the moment, you are not prepared to provide, at this  
10 moment, at least, the kind of discretion in the biological  
11 consultants that I am talking about?

12 MR. HOLLINGWORTH: No, I don't  
13 think that's fair, Mr. Commissioner. I think that the  
14 witness said that this matter is under review now. It's  
15 obviously a matter of very basic policy. Mr. Horte, at  
16 the very top of the Arctic Gas organization has spoken  
17 to it, and I think that we at the least ought to be  
18 given the opportunity to finish our review and then  
19 give an answer to Mr. Scott. It is obviously a very  
20 basic issue.

21 MR. SCOTT: Well if everybody  
22 recognizes how fundamental it is, I can't quarrel with  
23 that proposal, Mr. Commissioner.

24 Q Well now, Mr. Mirosh,  
25 about your sort of general logistics in construction,  
26 in question 3 on page 2, you tell us that the Foothills'  
27 tonnages to be transported are going to be in excess of  
28 one million tons, - but substantially less than CAGSL's?

29 A Yes, I --

30 Q I want to ask you if your



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estimate of tonnage includes the materials, equipment and so on, that will be required for the community service laterals?

A No sir, we have tried to compare there the main line activities of both ourselves and CAGPL, and on that basis we have not included in the CAGPL case, what we think the Alaska lateral requirements are.

Q No, no, I didn't mean the Alaska lateral requirements. I meant the laterals to Yellowknife, Pine Point and the other laterals?

A The way this testimony is written, I am referring only to the main line requirements for both projects.

Q All right. Well you see that's not very helpful is it, because in terms of logistics, we have to know how much you are going to carry up this valley, and if you say you are going to carry a million tons, that I understand now relates only to your main line construction?

A Correct.

Q All right, now how much more are you going to carry for the laterals?

A Can I check the application for that figure?

Q Certainly.

THE COMMISSIONER: Well let's stop for coffee, and you can check it during the coffee, sir.

( PROCEEDINGS ADJOURNED )



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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: Ladies and gentlemen, we will come to order. There are two matters relating to our schedule that I would like to raise. The first is that tomorrow we will stop for lunch at 11:30, from 11:30 until 2:00, instead of from 12:30 until 2:00.

The second matter is this, that I really am most anxious that we finish all of this evidence by Friday, that is by the time we leave here Friday afternoon, and I hope counsel and the Official Court Reporters and the CBC and the members of the press wouldn't be absolutely livid with rage if we scheduled a hearing for tomorrow evening if we felt it necessary to complete our work by Friday afternoon.

I understand there is some vital football game on this evening, so I appreciate

--

MR. GENEST: Cross-examination to be prepared, sir.

THE COMMISSIONER: -- so I know that it would be asking too much for people to sit this evening, but perhaps tomorrow night if you wouldn't mind. We will see how we are getting on, and then sit then.

MR. GENEST: Sir, in connection with the schedule, I took it from earlier on this week or last, that you hoped to finish the whole of



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phase 1 by this Friday. I understand from Mr. Scott that Mr. Adams from the Environment Protection Board will not be here this week. I also understand from Mr. Scott that Mr. Lewis, one of his witnesses, as to who's summary of evidence we have had some private words with Mr. Scott, but which he intends to rectify, we may not be able to complete his cross-examination.

I also have the problem of rebuttal evidence, which I really can't make a decision on until I have heard all of the other parties' evidence in Phase 1, and I expect sir, that I am not required to produce rebuttal evidence by Friday, if we have all these other matters --

THE COMMISSIONER: No, I think -- I'm speaking in a rough way, and I think that you plug in the rest of the evidence as we move along in the weeks to come, but let's finish this thing as far as we can this week.

MR. GENEST: Right.

THE COMMISSIONER: Because your witnesses have to get ready for the Energy Board and so forth and so on, and the rest of us have to get on to other subjects.

MR. GENEST: Right.

MR. SCOTT: Mr. Commissioner, could I suggest the timetable as I see it, after O & M are finished, which perhaps might be by lunch tomorrow at noon, or very shortly thereafter, we would then have Carson Templeton cross-examined.

His presence today has so





terrified us that my analysis is that that cross-examination will be shorter than he deserves. That's our best estimate at the moment.

MR. GENEST: He terrorized us all.

MR. SCOTT: Then we will have Professor Williams -- I'm sorry, Mr. Dau who will be relatively short, then we will have Professor Williams who we are calling; Mr. Owen --

THE COMMISSIONER: Who's Mr. Owen?

MR. SCOTT: Well he's going to give some evidence about the Pointed Mountain Line. Then Mr. Longlitz, and last Dr. Lewis. Now with respect to Dr. Lewis, Mr. Genest is right. He's finally found a summary of mine that I have agreed is inadequate.

What I propose is that Dr. Lewis, if he is reached, should give his evidence in chief. Counsel can attempt to cross-examine him if they want to. If they don't want to, we will bring him back to start off the next round for cross-examination.

Then we will have Carl Adam, who is the other E.P.B. witness that relates to this phase. Mr. Anthony tells us he may want to call Mr. Skinnarland but we have not received a summary yet, and that would presumably take us to Tuesday of the first week of the next sitting. I'm sorry, Wednesday, because it's Thanksgiving weekend, and then the rebuttal would occur, if any.

MR. GENEST: Perhaps --



THE COMMISSIONER: Excuse me, Phases 2 and 3 would be ready to proceed immediately thereafter.

MR. SCOTT: We will be ready to hear the evidence of Phases 2 and 3 immediately thereafter.

I am sorry. We are not going immediately to Phases 2 and 3, we are going to finish off the Whitehorse alternative corridors evidence, and that will be ready immediately after rebuttal, as I understand it.

THE COMMISSIONER: The Whitehorse evidence, are you getting all those people back from Alaska?

MR. SCOTT: We are working on that.

THE COMMISSIONER: Okay.

MR. MARSHALL: Are we going to proceed then, Mr. Scott to finish that off?

MR. SCOTT: My intention is that we should proceed. Our chances of getting them back for that week are as good as getting them back for any other week. If we can get them back, we will; if we can't, you may have to entertain Mr. Marshall's motion that their evidence be struck from the record.

THE COMMISSIONER: What about those witnesses from the United States? Did you cross-examine them, the conservationists? One was a lawyer and --

MR. MARSHALL: Yes, sir. In



the presentation that was made by CARC, there were three witnesses called, dealing with the wildlife range and we cross-examined those three. They called two witnesses from the State of Alaska, and I cross-examined Commissioner Parker.

THE COMMISSIONER: But not Mr. Weedon?

MR. MARSHALL: But not Dr. Weedon.

THE COMMISSIONER: And not Magistrate Sprecker?

MR. MARSHALL: Yes, Mr. Carter cross-examined him, but there were some witnesses who were called by Commission counsel -- or I'm sorry, I guess it was by CARC as well. Dr. Owen and Dr. Morlan? I'm sorry --

THE COMMISSIONER: There is only one witness then, Mr. Weedon, about which there would be any difficulty owing to his being beyond the jurisdiction of a subpoena from the Commission?

MR. MARSHALL: I would expect that's the case. Dr. Hughs is part of the Assessment Group, and Dr. Morlan, I think was as well.

THE COMMISSIONER: Yes, well I think they will turn up.

MR. MARSHALL: I'm sure they will.

MR. GENEST: Sir, while we are tidying up, you asked us a few days ago about an apparent discrepancy between the statement made by Mr. Workman



at one of the community hearings, as to the number or the maximum number of persons who would be north of 60 during the construction, during the peak construction time. I believe Mr. Workman had stated at the time that the number was around 4,000 and you referred to your recollection that Mr. Williams had given a different number.

Mr. Workman's figure, sir, was taken from an exhibit in our original application, and I think it referred to a number of -- or approximately 4,000 present in the Northwest Territories only, and it did not include anyone in the Yukon, and did not include that sort of administrative supervisory engineering layer, that has to be added to actual construction forces.

The actual numbers are given by Mr. Williams in his evidence in Volume 43, page 5575 and 5576, and the number -- the maximum number, sir, that will be employed at the peak time north of 60, both in the Yukon and the Northwest Territories, including that administrative layer, is between 5,800 and 6,000. So we apologize, sir, for any confusion that might have been caused by Mr. Workman's statement, and I hope that this will set the matter straight.

THE COMMISSIONER: Well in round numbers it's 6,000 instead of 4,000?

MR. GENEST: 6,000, that's right. That includes the Yukon and the administrators.





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MR. SCOTT:

Q Mr. Mirosh, are you able to help me now as to the amount of tonnage that should be added to the one million to include the laterals?

A Yes, that number is three percent of the mainline tonnage, approximately. and specifically for the Yellowknife-Pine Point lateral, it would be 32,000 tons and for the small laterals. to the communities in the valley, it would be 3200 tons.

Q Can you tell me how you propose to deliver pipe for the Yellowknife-Hay River, Pine Point lines to the sites?

A Yes, those lines are adjacent to highways, we would use truck transport.

Q Winter or summer?

A Those would be winter projects as well.

Q And I take it it follows from that that you don't intend to use the Fort Providence ferry?

A If that's what is required  
Q: Well, to get across the ---/it's not operative as I understand it, in the winter and the point of this series of questions was to find out whether you intended to use the Fort Providence Ferry which is a community service, and I take it that if you're going to be doing it in the winter, you won't be using the Fort Providence ferry?

A Not likely, there may be some requirement for material stock piling which could be done in the summer.



1 Q But I take it that sub-  
2 stantially the 32,000 tons will be moved in the winter?

3 A Yes sir.

4 Q Well now, I take it that  
5 to move your tonnage up the river, or down the river,  
6 what you contemplate is eight tugs and 48 barges, is that  
7 right?

8 A Yes, that's based on not  
9 utilizing the winter road to relieve that number. And  
10 it's based on not having any spare capacity in the  
11 existing transportation carriers.

12 Q But I take it that that  
13 you regard as a prudent estimate?

14 A That would be conservative.

15 Q How did you arrive at  
16 your estimate of barge requirements?

17 A Well we calculated the  
18 number of tons of different types of goods that had to be  
19 shipped, which are outlined in our application, we  
20 determined the size of barge which we should be  
21 using, which would have a dual capability of fuel and  
22 deck cargo, we laid out in general terms the bulky  
23 materials and how much deck space they would take,  
24 and in that case how much fuel we could add to the  
25 light loads, and conversely, when we were carrying  
26 heavier loads we determined whether we could carry any  
27 additional fuel, keeping in mind that we did not want to  
28 load the barges beyond 1150 tons each which would give  
29 us a draft sufficient to get through the shallows. and  
30 on that basis, then determined the amount of time we



would need to move from Hay River to each of the wharf sites, to unload the amount of cargo they required, and came up with the number.

Q Does your reference to the shallows mean that you don't either contemplate or depend on any dredging of the river?

A Yes, that's right. The load limitation which we have used, we understand, is in agreement with the existing carriers.

Q Have you or are you now carrying out any studies of current or projected river travel?

A Well we're continuing to analyze our logistics needs. And we will be getting into more logistic studies.

Q Perhaps I haven't made myself clear. I understand that you will be refining your requirements as you go along.

A Yes.

Q By studies. Have you done any studies about the impact of these requirements on the current or projected traffic on the river?

A You mean as to how they would pass each other and whether there would be enough personnel trained to --

Q That sort of thing.

A Yes, well we haven't carried out in-depth studies, we've been concerned about the availability of pilots and other personnel. We're told by the operators that with appropriate training



1 programs in advance these can be accommodated.

2 Q Have you any written work  
3 that you can refer me to which represents your current  
4 view about the impact in this area.

5 A We don't have an impact  
6 assessment of the logistics implications on the river,  
7 no.

8 Q Well as I read your  
9 evidence, you've told us that you need eight and I  
10 understand that you're going to go and get eight for  
11 yourselves unless you can get three from the present  
12 complement on the river, is that correct?

13 A Yes, if there were three  
14 or two or one or how many ever barge sets available,  
15 considered spare at the time, that would reduce the number  
16 of eight down to seven or six or five.

17 Q The question that  
18 concerns me is what inquiries or studies or analysis  
19 have you made about the practicability of getting one,  
20 two or three of the existing barges to service your  
21 needs?

22 You will be a pretty prime  
23 customer, I would think and I want to know about the  
24 impact of that proposal.

25 A Well we haven't carried  
26 out formal studies, what we've done is had a number of  
27 meetings with the major barge operators, and discussed  
28 our concepts with them and in turn obtained their ideas,  
29 to modify our thinking. It's hard for them to determine  
30 I think, at this stage, what the traffic will be with or





1 without the pipeline three or four years from now.

2 Q But I take it that it's  
3 obvious that you would be a pretty attractive customer  
4 to barge operators and what concerns me is is it your  
5 position that if barge traffic on the Mackenzie will be  
6 injured or restricted by your taking one, two or three  
7 barges, in that circumstance, do you intend to go ahead  
8 and get your own separately?

9 A Well this reference  
10 to spare capacity implies that they wouldn't be  
11 required for any other use.

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Q Over how many years are you going to be hauling by barge?

A Well the bulk of the materials would be over the two pipeline -- preceding the two pipeline construction years, but there would be additional material required at about a ten percent level of the peak during the preceding year, to -- or two summers prior to pipeline construction, and there also would be a requirement for about the same level of barging for the year following pipeline construction.

Q Well then do I understand that your possible utilization of spare barge capacity, would occur only in the two summers preceding construction?

A Well the peak requirement would occur during the summer preceding the first year of pipeline construction, and this peak could be shaved by utilizing spare capacity, if it was available.

Q But I take it that for any barging before that, or any barging after the second construction winter, you won't be required to utilize -- you will have your own facilities in effect, for barging?

A Well whether they will be our own, or whether they'll be the operators, is something that we haven't determined yet. We have allowed, in our approach to costing the project, that we would have to purchase, procure the tugs and barges. This may not be the case, if the operators determine that they would do it.



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Q Just one other matter.

In your evidence, in your transcribed evidence as you have said, you talk about forty-eight 1,500 ton barges and eight tugs. I notice that in distinction in your application, you talk about 28 as opposed to 48, two thousand ton barges, and four as opposed to eight tugs, each of the four being 4,500 horsepower. When was the change made and why?

A Well when we began on the project, we perhaps somewhat naively thought that we could utilize larger barges and load them to their peak capacity. Subsequently, we determined from talking to the river operators that this was not practical, and I think in my direct that I do state that we had originally assumed we would use 2,000 ton barges loaded to 2,000 tons.

This was changed because in effect it just would not have worked.

Q Does the alteration there have any implications for truck transport?

A No, the tonnage is directly transferrable from loading the number of 2,000 ton barges we had to 2,000 tons into loading the forty-eight barges with 1,150 tons each.

Q Yes. Well now, in another section of your application, you state "Applicant intends to store fuel in barges that have been beached following completion of their seasonal functional requirements". Now as I understand that, that means that some barges will be taken up -- is it up or down --



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taken down the river on their last trip, and instead of coming back they will be hauled up on a beach and used as a fuel storage depot, is that correct?

A Yes, that's in our thoughts. The barges would have to be beached somewhere, and it may be useful to us to beach them at the wharf site locations with appropriate dyking and foundation supports, so that we could utilize the barges as fuel storage, methanol storage and so on.

Q Is there some risk that the capacity of a barge to hold fuel oil on the river, which I understand is the function of competing pressures from inside and outside, may not be the same capacity as its ability to hold fuel on shore?

A Yes, that's a factor, and with that in mind, we have had consultation from a naval architect who has not only been advising us on the types of barges, but on the structural requirements for the hulls and support structures, as well as for the foundation requirements.

Q Could I ask the name of your advisor?

A Yes, it's Peter Hatfield from Vancouver.

Q Is there any precedent for this mode of storage?

A Not that I'm aware, but it sounds perfectly logical.

Q I guess all our ideas do before the precedent.





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A Well if the --

Q I am not criticizing, I  
just --

A -- barge is designed with  
that in mind, I think it's very sound.

Q Have you put this idea  
either to your environmental consultants, or to the  
Fisheries Service of Environment Canada?

A Well our environmental  
consultants have been aware of it. We haven't put it  
to the Fisheries people, no.

Q Bearing in mind the  
possibility of dyking, have your environmental people  
any reservations about it?

A No, dyking would be a  
normal requirement for fuel storage at the stockpile  
sites, in any event.

Q Apart from that, do they  
have any reservations about this method and this place-  
ment of fuel storage?

A No, they haven't expressed  
any reservations to us.

Q Would this be done over  
two seasons, or more?

A It would be -- if it was  
done, it would be done during the two main line pipeline  
construction seasons.

Q Is there any suggestion  
that this will be a delaying factor in your logistics,  
in the sense that the barges will not be at the depot at



the commencement of the next season?

A No, this shouldn't affect us because we would probably not beach more than two barges at eight locations, which is 16 out of 48. That leaves us with a sufficient fleet to begin operations with in the early summer.

Q Perhaps you can't do it now, but could you let Mr. Hollingworth know where you anticipate those locations will be?

A Yes, I can.

Q Now I have read your evidence in question 4 about staging sites, and among others you refer to Axe Point, Dory Point and Poplar Landing. Now, we have been able to find Dory Point, but we haven't been able to find on any map Axe Point or Poplar Landing. Can you point them out to us so we know where they are?

A Yes, I have a map here which should have been up during my direct evidence, and we can place it up right now.

Q Well perhaps you could -- do you want to make it an exhibit? Is it a small map or a large map?

A It's a wall map.

THE COMMISSIONER: Let's just put it on the wall.



1 MR. SCOTT: Mr. Mirosh just so  
2 we'll have it on the record. you've now produced a map  
3 which has on it, a series of green triangles and noted  
4 particularly by name are Ax Point Dory Point and Poplar  
5 Landing, which I anticipate are possible staging areas,  
6 is that correct?

7 A Yes, we're considering  
8 them.

9 Q And the other green tri-  
10 angles by and large are wharves?

11 A They are wharf sites along  
12 the Mackenzie River, yes.

13 Q Taking Ax Point,  
14 Dory Point and Poplar Landing, as staging areas, how  
15 do you get the materials to those points?

16 A It would be overland by  
17 truck, from the railhead location which would be Enter-  
18 prise generally.

19 Q Is this by summer road or  
20 winter road?

21 A We anticipate an all  
22 weather road into Ax Point. The others would be winter  
23 roads.

24 Q Who is going to build the  
25 road?

26 A The all weather road  
27 as would the winter roads, would be part of the pipeline  
28 project.

29 Q Are you having staging at  
30 Fort Simpson as well?



1 A Well we're considering that  
2 and that's put forward as a possibility as well as the  
3 Mackenzie Highway crossing near Fort Simpson.

4 Q As I understand it, the  
5 principal staging area for Arctic Gas's proposal is  
6 Fort Simpson, yours is a little different, in the way  
7 we've described, Mr. Marshall is going to --

8 MR. MARSHALL: Hay River.

9 MR. SCOTT: I'm sorry, Hay  
10 River.

11 Q What are the -- I can  
12 tell when Mr. Williams looks over his glasses at me  
13 that I've said something seriously in error.

14 How do you compare the two  
15 proposals in terms of pluses and minuses?

16 A Well one of our primary  
17 considerations in looking at Ax Point was to obtain a  
18 faster start on logistics and we know from records that  
19 we can gain two or two and a half weeks at this location  
20 and this is very crucial to us when we have such a small  
21 time window to work with.

22 The other considerations would  
23 be --

24 Q If I can just interrupt  
25 you. That means that you can get on the barges faster?

26 A Yes, two to two and a  
27 half weeks sooner. The other considerations would be that  
28 we have looked at Hay River and we plan on utilizing it  
29 to a moderate degree, especially for material that can  
30 go right from rail to barge. But Hay River does have a





1 strain on its locations for good staging and we had  
2 thought it would be better to spread the staging out over  
3 areas other than Hay River.

4 Q Can you tell me in general  
5 terms what your physical requirements in terms of space  
6 at Hay River and Enterprise will be for staging?

7 A I don't think I have that  
8 with me but I would be happy to supply these acreage  
9 figures to you either later today or tomorrow.

10 Q Thank you. Could you do  
11 the same for the three for Dory Point, the other three?

12 A Yes.

13 Q Have you done any work  
14 on the adequacy of the three locations, Ax Point, Dory  
15 Point and Poplar Landing from the point of view of barge  
16 shipment and barge transportation?

17 A Yes, the Ax Point location  
18 is, we are advised extremely compatible with barging.  
19 It has stable shoreline for a considerable distance.

20 Q Who advised you of that,  
21 if I may ask?

22 A Well we've talked to the  
23 operators on that and they in fact have their eyes on  
24 the locations that we're mentioning to you, so from their  
25 point of view these are all prime staging locations for  
26 barge operations.

27 Q Well now in question five  
28 at the top of page 6, you refer to the possibility of  
29 shipping fuel to the Mackenzie River system via the  
30 Beaufort Sea. Is that a contingency plan that is more



1 than a drawing on the back of an envelope?

2 A Well we've had discussions  
3 with coastal barge operators about this possibility and  
4 have over flown the area with the experts. It's a possi-  
5 bility that we put forward perhaps this year is a bad  
6 year to put that possibility forward

7 Q You're anticipating.

8 A But we are considering  
9 a tanker of about 35,000 tons as being feasible to bring  
10 into the north end, we note that large ships do come  
11 into that area.

12 Q How far up the river  
13 would you contemplate shipping fuel?

14 A I guess our investigations  
15 so far have led us to placing a tanker around Tuktoyaktuk.

16 Q Do I understand then that  
17 you probably wouldn't consider taking it up any further?

18 A No.  
19 It would be a barge operation from there.

20 Q I see well what I really  
21 meant was how far up the river do you intend to barge?

22 A I think to about the first  
23 four or five spreads for fuel. From the top end down.

24 Q Well where does that take  
25 us to? Is that about Fort Good Hope?

26 A It would be somewhat south  
27 of Fort Good Hope.

28 Q Well I put it to you that  
29 with these loaded barges going up river, there are going  
30 to be serious problems aren't there in terms of the speed



1 with which they can move in view of the current?

2 A Yes.

3 Q In other words they may  
4 be moving as little as three miles an hour.

5 A Yes, three to five.

6 Q Is that an economic or  
7 realistic prospect?

8 A Well this is part of our  
9 continuing investigation and one reason among many that  
10 we haven't put this forward as a definitive proposal.

11 Q What do the barge operators  
12 that you've been talking to think of that?



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1                   A     Well, that particular  
2 concept we haven't talked with the Mackenzie barge  
3 operators on.

4                   Q     Well now your reference  
5 to the fact that this isn't a year that you would hope  
6 to be confronted with carrying fuel via that route  
7 raises another question. Do you intend, at any time  
8 to do a detailed computer simulated model of the whole  
9 project, that is a sort of critical path analysis?

10                  A     Yes, the logistics com-  
11 ponent in addition to the construction schedule, would  
12 both be on a program.

13                  Q     When is it anticipated  
14 that that will be done?

15                  A     Well we are currently  
16 moving towards that development on logistics, and on  
17 construction, but like everything else in a preliminary  
18 form, it will be completed during the preliminary  
19 phase, and that phase will likely last through at least  
20 half of next year. We should have some preliminary  
21 programs by then.

22                  Q     When is that date?

23                  A     Well I say that phase  
24 will likely last through most of next year, and after  
25 that period will enter hopefully a final design phase  
26 when these programs would be crystallized.

27                  Q     Who is doing the critical  
28 path analysis for-you?

29                  A     This work is currently  
30 being handled by our staff.





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1 But that doesn't preclude the  
2 consultation with experts in the field which we intend  
3 to do.

4 Q Will this analysis include  
5 the requirements of the Delta producers? Or make  
6 allowances for them?

7 A In the logistics component;  
8 it will affect us to the degree that that will tell us  
9 whether there is any spare barge capacity, and also that  
10 will tell us as to the rail capacity between the south  
11 and Hay River and Enterprise, so that we will take these  
12 things into account, but we won't try to incorporate a  
13 unified construction schedule with the producers plans,  
14 except that we would be aware of their target dates,  
15 and these would be keyed to ours.

16 Q The reason I asked this is  
17 that it's occurred to me that much of your present  
18 estimations depends on averaging, for example Mr. Jarvis'  
19 charts' about snow roads are based on an analysis of  
20 sort of historical data and averaging it out, and it  
21 seems to me that you run into certain problems if instead  
22 of having the worst year one in every ten, you have, as  
23 may happen, unfortunately, two worst years succeeding  
24 each other. Surely the way to resolve this is to develop  
25 a critical path analysis, which will show you where you  
26 can take up slack and so forth. Am I right about that?

27 A Yes, I agree a critical  
28 path or pert or any other tool like that is neces-  
29 sary.

30 Q Well now, one or two



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1 questions about wharves. You say in question 7 that  
2 you are going to upgrade all existing wharves, and I  
3 anticipate that you mean especially or perhaps among  
4 others, Fort Good Hope and Fort Norman.

5 Now, this seems to be the con-  
6 ventional wisdom that applicants are going to upgrade  
7 these wharves until they go and take a look at them,  
8 and then they decide that they might as well begin all  
9 over again and build new ones. That was I think Mr.  
10 O'Rourke's evidence for Arctic Gas. What do you say  
11 about that? Is upgrading a feasible possibility?

12 A Well I think that we did  
13 say that we would upgrade them if it was acceptable to  
14 the communities, and part of that statement is intended  
15 as a good corporate citizen, if this is something the  
16 communities want, because we can use a wharf in these  
17 locations. If it's something the communities don't want,  
18 we would certainly create our own.

19 Q I take it, though, as a  
20 practical matter, the realistic and economic consider-  
21 ations would dictate building your own wharves?

22 A Well at these communities  
23 we would find wharves at these locations useful.

24 Q Well now you also refer  
25 to portable wharves. Are there any precedents for their  
26 use on a project of this type?

27 A I think that others have  
28 installed floating structures which have then been sunk  
29 or shall we say laid to rest, on the bottom of the  
30 shore, and used in this manner, following which the



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1 ballast water could be pumped out and the structure  
2 withdrawn to shore during the winter.

3 Q Well is that what you  
4 propose to do?

5 A Yes, that's one approach  
6 that we are proposing. There is also the approach of  
7 utilizing a floating structure, which may have some  
8 crane structures on either end. There is also the  
9 possibility of beaching barges directly on the beach,  
10 if they have a ramp and if the material carried on them  
11 can be off-loaded that way.

12 Q Well apart altogether  
13 from being a good citizen and developing wharves consist-  
14 ent with the communities' needs, I take it that you  
15 yourselves are going to need wharves after the project  
16 is constructed?

17 A Are going to?

18 Q Are going to.

19 A No, only if we entered  
20 into a looping program immediately which we haven't  
21 anticipated.

22 Q Will all your supplies or  
23 whatever be brought in by helicopter if you have no  
24 wharves, after construction?

25 A Well for maintenance  
26 purposes, the largest components can be moved by the  
27 helicopter, yes.

28 If there are other more strin-  
29 gent requirements, then these can be planned to be  
30 handled by winter road; by the road which we hope will



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1 be in existence through to Inuvik.

2 Q Well now one other -- one  
3 or two other short matters. You say that in addition  
4 to using air strips where they exist, and I think that's  
5 at Wrigley, Good Hope, Fort Norman and Norman Wells,  
6 you would rely in the winter on winter air strips and  
7 lakes. Have you isolated any of these locations which  
8 you can identify?

9 A Well there are some that  
10 come to mind immediately. I know that having overflowed  
11 the area, there are a number of -- without referring to  
12 lakes, there are a number of abandoned air strips or  
13 air strips that are utilized only in the winter time.  
14 Some of the old CNT air strips, there's an air strip on  
15 Richards Island in addition to the one that the Gulf  
16 plant has. These we have isolated.

17 Q Well leaving aside  
18 abandoned air strips, what I'm really concerned about  
19 is whether you have isolated lakes or other areas that  
20 you might utilize for winter landing, because if you  
21 have, I would like to know -- not today perhaps -- but  
22 I would like to know where they are.

23 A No we haven't, because we  
24 are aware that there are a great many bodies of water  
25 along the route which we could utilize, and we just  
26 haven't thought that to be a problem.

27 Q Well I just don't want  
28 your planes to get caught in the trapline that runs  
29 along some lake.







1  
2 Q Mr. Kosten, you've referred  
3 to collective agreements that exist between the operators  
4 association and the trade unions. I take it that they  
5 may have to be renegotiated as the years pass and as  
6 this project becomes live?

7 WITNESS KOSTEN:

8 A Some of them would run  
9 out, in other words terminate, the agreements normally  
10 are for a specific period of time.

11 Q Is it true that all those  
12 collective agreements contain a no strike clause?

13 A Yes, I believe that is  
14 correct.

15 Q And generally speaking,  
16 what is the life of a collective agreement in this  
17 industry, is it one year, two years, three years?

18 A Well they'll vary from  
19 one year to up to five years, there are some that  
20 are up to five years.

21 Q Yes and I take it they  
22 all have different termination dates usually, there  
23 isn't a consistent termination date obviously?

24 A That is correct, yes.

25 MR. SCOTT: Those are all the  
26 questions I have sir. Thank you very much gentlemen.

27 THE COMMISSIONER: Any re-  
28 examination Mr. Hollingworth?

29 RE-EXAMINATION BY MR. HOLLINGWORTH:

Q Mr. Bauer, during Mr.  
Scott's cross-examination, this morning I believe it was,



1 the question of whether permafrost would be bermed came  
2 up and there was a disagreement between your evidence and  
3 Mr. Kosten's. Mr. Kosten stated that the practice would  
4 not be followed and I don't think that you had a chance  
5 to speak to the matter again. I wonder if you have any  
6 remark at this time?

7 WITNESS BAUER:

8 A Yes, the reference was  
9 with respect to conventional pipelining insofar as the  
10 berm over the ditch, I agree <sup>that</sup> would have no application  
11 in permafrost, and wish the record to be corrected  
12 accordingly.

13 Q Just so I have this  
14 clear, you're stating that permafrost would not be  
15 bermed with snow in the manner that was described this  
16 morning?

17 A That's correct.

18 Q And Mr. Jarvis, yesterday,  
19 in response to Mr. Genest's questioning, you agreed  
20 to look at the Inuvik snow road study and comment on  
21 it but I don't think the matter was ever brought up  
22 again and I wonder if you have some remarks on that.

23 MR. GENEST: I think it  
24 was Mr. Hollingworth. The trouble was somebody pinched  
25 it from our library, and all he got to look at was some  
26 pictures and some direct testimony.

27 MR. HOLLINGWORTH. I think there  
28 were a couple of questions that were put, possibly by  
29 you, I'm not sure on that, but I don't think that a full  
30 comment was every obtained on it.



1 WITNESS JARVIS:

2 A I believe I was given the  
3 option of commenting and perhaps I could referring to  
4 Mr. Williams testimony, what I gathered from that is  
5 that the test site at Inuvik work was begun in late  
6 October, the kind of preparatory work that I have  
7 suggested in my report and in my presentation, but that  
8 because of lack of snow the actual construction of the  
9 road did not begin until sometime early in December.  
10 I would observe that at that time, given that there was  
11 apparently about 12 inches of the active layer, was  
12 about 12 inches thick, that that would be completely  
13 frozen by referring to the degree day depth of freezing  
14 charts I have. So that, at the time the road was  
15 constructed, there was a solid road bed in place. The  
16 problems that were dealt with subsequently were those  
17 of producing enough snow to provide a level surface.  
18 Now, that's / <sup>the</sup> situation as I understand, at Inuvik and  
19 that's not much help to me in preparing a construction  
20 schedule that would cover spreads one and two as proposed  
21 by Foothills Pipe Lines. I have observed, drillhole  
22 data which indicates that the active layer is in the  
23 order of five or six feet thick so that what , and in  
24 presenting a practical construction schedule, I must  
25 assume that those areas may be the first ones that would  
26 have to be dealt with. Now, what I have recommended in-  
27 dicates that unless there is 12 to 14 inches of frozen  
28 material, underlying the road surface, that construction  
29 operations should not proceed. Initially the operations  
30 would proceed with low ground pressure vehicles and later



1 on with motor graders and the like, and it would be  
2 safe to do that. My terms of reference include consider-  
3 ation of the environment, and minimizing damage. Now,  
4 when the next phase or the next question really is when  
5 can hauling begin and looking over the type of traffic  
6 and so on that is proposed it's my feeling that there  
7 should be at least 30 inches of road bed before that  
8 type of hauling is proceeded with.

9 Now, that requires something  
10 in the order of 2,000 degree days and for that reason  
11 I could not recommend to Foothills that they began  
12 hauling operations until at the best, under the best  
13 circumstances, around around the end of November.  
14 Anybody else who gave me the same terms of reference,  
15 I couldn't recommend anything differently.

16 THE COMMISSIONER:

16 Q Well in the chart  
17 relating to spreads one and two, you showed that --  
18 which is where Inuvik is. You showed that hauling  
19 couldn't begin on the average, until early in  
20 December.

21 A On the average yes.

22 Under the best conditions.

23 Q Under the best  
24 conditions you had late, late November?

25 A Right that's correct.

26 MR HOLLINGWORTH: Could I  
27 just have a moment, Mr. Commissioner.

28 Q Just one final question,  
29 Mr. Mirosh, shortly before the coffee break, Mr. Scott  
30 asked you for numbers of various environmental inspectors







1 I understand you have some information you can present to  
2 the inquiry now on that?

3 WITNESS MIROSH.

4 A Yes, I was in contact  
5 with our environmental people during the coffee break  
6 and Mr. Scott was correct in saying I should probably  
7 check with them first, but I do have some information  
8 which is not too different from what I offered.  
9 I'd like to put it forward.



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ReDirect by Mr. Hollingworth

The environmental people advise me that they are considering placing three people on each spread. One would be a physical scientist which would be related to geotechnical and hydrological concerns. One would be a biological scientist and one would be a senior inspector who would have qualifications similar to the other two, but who would have field work behind him.

In addition to these three people on each spread, there would be one chief environmental inspector at each of the three construction locations, which are similar to the Operations and Maintenance locations at Inuvik, Norman Wells and Fort Simpson.

In addition, there would be what is referred to as a floating group of specialists, who would be travelling along the entire construction locations. This is proposed to be a group of five specialists; one in archaeology; one in mammology; one a fish expert; one a bird expert and one a terrain expert, and these people would be called upon to look at specific problems in specific locations, and help the spread environmental inspectors.

In addition, in the head office there would be from four to seven specialists, working from that location, and there would in addition be some extra people to spell off the field inspectors who would be on rotation.

The total estimated number of environmental inspectors would be between 30 and 50.



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ReDirect by Mr. Hollingworth

1 Their qualifications would include formal training in  
2 their specialty, and also a Foothills training program  
3 in both engineering and construction, which I'm told  
4 might last from six months to one year, prior to getting  
5 out in the field.

6 As to shutting down activities,  
7 the current thoughts are that the senior inspector on  
8 the spread would have the capacity to shut the spread  
9 down for an environmental problem, if it couldn't be  
10 resolved locally. The duration would be sufficient to  
11 get the district chief inspector on site, and make a  
12 decision whether it can be resolved at a higher level  
13 then, or whether it would take a longer time. The  
14 district inspector would then have the option of contin-  
15 uing the shutdown for a specified period of time, until  
16 the issue was resolved.

17 MR. HOLLINGWORTH: That com-  
18 pletes the re-examination, Mr. Commissioner.

19 MR. GENEST: Mr. Commissioner,  
20 I don't know what the rules are. I know my friend, I  
21 know I have had my crack at cross-examination. There  
22 were some comments on Mr. Williams' Inuvik evidence that  
23 were not raised in chief in any way, on which I have  
24 had no opportunity to ask questions, and I wonder if I  
25 might have your indulgence for just a few questions?

26 THE COMMISSIONER: Well if you  
27 had been able to put the report or whatever it was to  
28 him during your cross-examination, if it hadn't dis-  
29 appeared, then it seems to me you would have been able to  
30 put the questions to him then. Thus I think you should



1 be able to put them to him now. What do you say, Mr.  
2 Hollingworth?

3 MR. HOLLINGWORTH: Well I just  
4 wondered why, having asked for his comments during his  
5 cross-examination, Mr. Genest didn't continue with it  
6 later on in the evening after Mr. Jarvis had had a chance  
7 to look it over and could have given his comments at  
8 that time.

9 It seems to me that my re-  
10 examination was in response to a request of Mr. Genest's,  
11 and one in which I believe you exhibited some interest  
12 as well, and we wanted to put it onto the record, and I  
13 was frankly rather surprised when Mr. Genest didn't  
14 follow up on it during his cross-examination.

15 MR. SCOTT: Well Mr. Commiss-  
16 ioner, respectfully, we have made it clear from the very  
17 beginning that the rules are there to be followed, but  
18 they are also there to ensure that everybody is entitled  
19 to raise matters that they want to raise, and even if it  
20 may mean that Mr. Hollingworth has another question at  
21 the end of Mr. Genest, it seems to me to be a grave  
22 misfortune if we didn't let them both fully satisfy  
23 themselves. Briefly.

24 THE COMMISSIONER: Well it  
25 would be a grave misfortune if they went on past 5:00  
26 o'clock, that's all I can say.

27 Carry on, Mr. Genest.

28 MR. GENEST: Thank you.

29 THE COMMISSIONER: No, I think  
30 you are entitled to put this.





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Cr. Exam. by Mr. Genest (Cont'd.)

1 MR. GENEST: I will undertake  
2 not to go beyond 5:00 o'clock.

3 MR. HOLLINGWORTH: This is  
4 the second time it's happened; sir.

5 THE COMMISSIONER: Yes, I know  
6 it is. I know it is, and there may come a time when you  
7 will be wanting to do this and you'll remember and you'll  
8 remind me how generous I was to Arctic Gas. I will show  
9 equal generosity to Foothills, I promise you.

10  
11 CROSS-EXAMINATION BY MR. GENEST, CONTINUED:

12  
13 Q I just want a couple of  
14 clarification questions, Mr. Jarvis. You just said that  
15 as far as hauling is concerned, you couldn't recommend  
16 it until the frost had penetrated to a certain degree  
17 down in the ground. Did I understand that correctly?

18 WITNESS JARVIS:

19 A Yes, that's right.

20 Q And do I understand that  
21 you mean by hauling, the use of heavy wheeled vehicles  
22 that would be going along the right-of-way?

23 A Yes, that's correct.

24 Q Would that answer equally  
25 apply, sir, to tracked vehicles such as those that  
26 would be used in building the road itself?

27 A No, not that type of  
28 equipment.

29 Q And is there any reason  
30 that you know of, sir, why construction in the early



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1 stages, that's hauling of pipeline construction equipment,  
2 could not be made by using low ground pressure vehicles,  
3 such as tracked vehicles?



1 A There's no reason I know  
2 of.

3 Q When you read Mr.  
4 Williams' testimony sir, did you -- I wondered if you  
5 noted that the active layer ~~that you~~ describe was frozen  
6 some two weeks ahead of the surrounding terrain by  
7 reason of the preparatory work that you have  
8 described?

9 A I didn't notice that sir  
10 but I would assume that would be the case.

11 Q Would you assume that  
12 to be the case in your opinion?

13 A Yes.

14 Q The preparatory work  
15 would accomplish that sort of result, would it?

16 A That's why you do it  
17 yes sir.

18 MR. GENEST: That's all I have  
19 sir.

20 THE COMMISSIONER: Do you want  
21 to ask any further questions arising out of that?

22 MR. HOLLINGWORTH: No re-re-  
23 examination Mr. Commissioner.

24 THE COMMISSIONER: Well I think  
25 we should break until tomorrow, to begin the operating and  
26 maintenance panel. Thank you again Mr. Mirosh.

27 MR. HOLLINGWORTH: It's entirely  
28 up to you.  
29 I might advise that that evidence is some six pages in  
30 length. It's not a lengthy document.

31 THE COMMISSIONER: Well I think



1 we should be fresh when we grapple with it. So we'll --  
2 well thank you Mr. Mirosh and Mr. Jarvis and Mr. Bauer  
3 and Mr. Kosten. I' guess we'll be seeing some of you  
4 on tomorrow's panel. If not we'll look forward to seeing  
5 you again on some other occasion.

6 (WITNESSES ASIDE)

7 (PROCEEDINGS ADJOURNED TO SEPTEMBER 24, 1975 AT 9:00 A.M.)  
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